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The present condition of the study of medicine is well calculated to engender distress and even alarm on contemplation of its ramifications, its ever-increasing complexity, and the self-contained, self-sufficient certainty of the exponents of its various cults. It is a commonplace how the influence of a recently acquired specialty leads almost inevitably to obsession during which the victim, incapable of adequate judgment, unconsciously distorts all circumstances to agree with his misconception. I have recently read an attractively specious monograph on osteopathy which showed convincingly that the familiar pain in the right iliac fossa was due to sensitiveness of the ligaments on the anterior aspect of the sacro-iliac joint, necessarily curable by manipulation and not by appendicectomy; and that bronchial asthma, which I had supposed to be in some way related to the vagus nerve, was again of mechanical origin; immobility of the joints of the thoracic spine causing sympathetic irritation. Similar articular explanations were forthcoming for mastitis, dyspepsia, and even cancer, and I am bound to say the explanations were plausible.

And so it is in greater or less degree with every aspect of disease and treatment, but most of all perhaps when one endeavours to probe into the possibilities of psychically determined disorders and to differentiate so-called organic from so-called functional diseases. Adequately to comprehend the physical basis of psychological illness would be to understand the mechanism of the working of the mind and the mystery of life itself. I do not think the present-day medical student lacks an early introduction to psychopathology even if he rarely enjoys the advantage of a systematic training. But until comparatively recently he was brought up to discredit a belief in a psychologically determined disorder and to maintain an emphatic insistence on the possibility of always discovering some physical abnormality to explain the symptoms. It is clear that in such an attitude there is a twofold error: first, the incapacity to distinguish the limits of the normal and of the legitimately negligible; secondly, the petitio principii of identifying the symptom complained of with the supposed abnormality.

MIND AND BODY

On their side and whatever their bias, the psychotherapists perpetually reiterate the importance of the physical side. The mind, they realise, is too intimately associated with the body for any symptom of mental or emotional disorders to be taken by itself without searching exhaustively for a possibly related physical factor. Moreover they appreciate how reassurance is often obtained only after a complete physical examination. Most people prefer to be ill in their bodies than in their minds; and the discovery of a physical defect however slight and even frankly unconvincing is eagerly seized upon in order that the responsibility for recovery may be removed from the patient's own endeavours. Thus it is easily understood why sepsis of some kind or other has an almost unlimited scope; for even when the comparatively accessible teeth, tonsils, appendix, gall-bladder, and prostate are exonerated, there is the inexhaustible field supplied by intestinal bacteriology. Sir Almroth Wright was once challenged as not believing in any diseases which were not bacterial and is said to have retorted, "tell me of a single example in which you can absolutely exclude the bacterial factor." As another enterprise one recalls the alleged disabilities arising from unduly mobile or unduly immobile viscera in which symptoms are explainable on a semi-mechanical, semi-neurogenic basis; whilst the influence of the ductless glands in the excess, deficiency, or perversion of their secretions illustrates best of all the link between physical or chemical changes and nervous disturbances.

ALTERNATIVE INTERPRETATIONS

There is in most physicians a bias in general towards the physical or the psychical side however much they school themselves to appreciate a dual or reciprocal influence. The improvement of the dyspeptic anæmic girl by marriage is a good example of alternative interpretation. To the organicist, here is obviously the influence of ovarian secretion however that may act; to the psychologist it is as clearly the massive diversion of nervous impulses into fresh channels. Ernest Jones in referring to the administration of asafœtida and valerian reminds us of the original idea that these drugs were chosen for their evil smell to drive the uterus from its wanderings into its proper position. There is, he suggests, no better foundation for the persistence of their employment than the original misconception which has long since been forgotten. Admittedly they are sometimes prescribed for troublesome patients as a punitive measure: but in the first place when they are legitimately indicated patients do not dislike them; and secondly, deodorised valerian is quite effective. And the fall in the output of urine following the administration of valerian in diabetes insipidus where there is a disturbance or disease of the pituitary is additional evidence of direct action.

Nobody denies the influence of the mind over the body as we put it, and most people accept the influence of the body upon the mind. It would seem that the psychic influence over the physiological functions is greater than the physical over the psychic, for we occasionally see those that are physically weak with apparently perfect trends of thought, but it is unusual to see one with a disturbed psychic equilibrium who does not at the same time have disturbed physiological functions. Wrong trends of thought if persisted in are usually followed by pathological changes brought about through nerve stimulation and changes in the internal secretions—the psychophysical link par excellence.

THE VEGETATIVE NERVOUS SYSTEM

In regard to the reciprocal action of the nervous system and the visceral functions we are particularly concerned with the involuntary portion, or, as it is sometimes called, the vegetative nervous system. This is divisible into two parts. The sympathetic includes all fibres with their peripheral and central connexions from the first dorsal to the third lumbar spinal segments, a very uniform anatomical arrangement of which the vertebral chain of sympathetic ganglia is the most characteristic. The parasympathetic, or extended vagus, is irregularly distributed in its outflow from the central mass of nerve tissue. A mid-brain outflow is composed of fibres that run

* A lecture delivered to the Institute of Medical Psychology.

with the third nerve to the ciliary ganglion. A bulbar outflow travels with the seventh and ninth nerves to the geniculate, spheno-palatine, and otic ganglia to supply the lacrymal gland, the salivary glands, and vasodilator fibres to the head and neck. The most important autonomic outflow is the vagus itself which supplies the respiratory tract, the heart, the digestive system from the œsophagus to the transverse colon, the liver, and pancreas. In the sacral region of the cord, the pelvic nerve runs from the first two sacral segments to make connexions with the pelvic and hæmorrhoidal plexuses to supply the descending colon, the sigmoid, rectum, and the genito-urinary system.

In this widespread innervation, the two parts of the sympathetic nervous system have an antagonistic action which has been compared to the control of a horse by a pair of reins. Perfect function connotes no undue prominence of either component. Relative over-action of the one or other leads to a state known as vagotonia or sympathicotonia respectively, with consequences which may be interpreted in terms of the physiological action of the part or parts supplied.

The next important consideration is that the secretions of the thyroid, pituitary, and adrenals have with the sympathetic proper a reciprocal reversible influence, and we can well understand how neuropaths whose organic nervous system suffers a rebound of the disorders caused in the internal secretions may be assisted by such widely differing forms of therapy as surgical operations, the administration of drugs or of tissue extracts, or by psychotherapeutic measures of various kinds.

EMOTIONS

The influence of emotions upon the organic functions of the body recalls a multitude of everyday experiences. We may anticipate that with progressing civilisation, the threshold to painful emotions—indeed to emotions of all kinds—becomes lowered and resulting organic disabilities in proportion become exaggerated. A psychical impression may produce disturbances at various levels—psychic, sensori-motor, or vegetative; and we see in such manifestations the exaggerated response of a defensive mechanism which may be perverted so as to produce, through the thyroid gland, Graves's disease; through the pituitary, diabetes insipidus; through the pancreas, diabetes; by production of spasm and atony and the inhibition of secretions, digestive disturbances; and again through the endocrines, a persistent and dangerous rapid blood pressure. Other examples of psychic disturbances exerted through the autonomic nervous system are disorders of menstruation, the secretion of milk, enuresis, perspiration, and perhaps every visceral function.

The somatic disturbance produced through stimulation of the adrenals and the sympathetic nervous system as a reaction of an emotional state is a reversible process: emotional disturbances may be caused primarily in the somatic system. The simplest examples of such cases are those associated with hyperthyroidism in which anxiety is a common factor. A primary over-active thyroid may itself as a sympathetic stimulant cause emotional disturbances just as primary emotional disturbances may cause a secondary over-active thyroid with tachycardia, exophthalmos, increased metabolism, and the manifestations of exaggerated sympathetic stimulation; though it is well to pause and reflect that for the development of Graves's disease, all or at any rate at least two of the three factors, nutritional, psychic, and infection, must be operable. For a protracted infection may first stimulate and then paralyse any of the endocrines.

Proceeding further from the psychical into the mental field we recall that the subjects of dementia præcox generally have gonodal inadequacy which may possibly be congenital but may also be a heritage of mumps. Other toxins, some of them admittedly nebulous in the production of hypo-adrenia, lead to a vagotonic state with apprehension, sense of fatigue, and the general disability referred to as neurasthenia. Again, as a result of unstable adrenal functions, all emotions tinged with fear will produce changes in the adrenal output so that morbid blushing easily ensues. The thyroid is in turn stimulated to produce a cardio-vascular instability or, in a word, sympathicotonia.

Psychiatrists recognise a class of mental disorders dependent upon a slow poisoning by a small residue of infection apart from toxæmias of acute fevers or infections. T. C. Graves instances the nasal catarrh following an attack of measles, scarlet fever, or influenza, and isolates a group of certifiable patients who exhibit a syndrome which progresses through a series of neurological disturbances, anomalies of taste, vision, and balance, to psychoses of depression, fear, and confusion. Presumably the toxins as before act upon the endocrines. The lucid intervals of such disturbances become shorter until dementia sets in, which Dr. Graves states to be curable by injections of colloid calcium oleate, of colloidal sulphur, or of T.A.B. Specific vaccines he considers to be inferior in action. Whatever our view upon these bacterial poisons, it seems evident that Dr. Graves's patients must have some factor which predisposes them to mental disorders, or must lack some resistance mechanism which ought to protect the nervous system against invasion.

THE CENTRAL ASSOCIATIONS

Cushing's observations of gastric ulcers following operations upon the cerebellum and of gastric erosions accompanying intracranial lesions, together with experimental evidence, support the hypothesis that a parasympathetic centre exists in the hypothalamic region, and that the integrity of the gastric mucosa depends on a nice balance between this centre acting through the vagus and the sympathetic centres acting through the cœliac plexus and the splanchnic nerves. Intracranial disturbance causes gastric ulceration by irritation of the hypothalamic or vagal nucleus which may also be interpreted in terms of under-action of the sympathetic. R. V. Light has produced peptic ulcers experimentally by stimulating the parasympathetic by pilocarpine.

How far purely psychical causes might be responsible for gastric ulceration is clearly a subject for speculation once a neurogenic possibility has been introduced for a remote visceral lesion, since the vegetative centres in the mid-brain are under cortical control. And the connexion of the cortex with the viscera through the involuntary nervous system implies that eventually every peripheral physical process in whatever part of the body it takes place is potentially influenced by psychical factors. Lange and James taught us that emotions arise in and are founded upon the viscera. Without change in the blood-supply of organs and muscles no emotion is felt and little action undertaken. States of depression, of calm, and exaltation can accompany normal or disturbed nutrition and upset the balance between the muscles, organs, and ductless glands.

It will be recalled how emotional stress caused the

sympathetic chaplain in "It's Never too Late to Mend" to vomit; on the one occasion when that relief to his emotional stress failed he became jaundiced. I personally do not possess that useful accomplishment, but I have been assured by several people that they can produce a tingling and ultimately a sensation of warmth in their cold feet by concentrating their attention upon their extremities. A pupil can be made to dilate and contract by *thinking* of a dark cellar or a blaze of light. The influence of vascularity can be applied to almost all the systems. A person's face blushes when he loses his psychovascular control; asthma has been described as blushing in the lungs, some kinds of nervous dyspepsia may depend on vascular changes in the stomach, and mucous colitis acquires a similar explanation. On these lines, the Christian Scientists have claimed to cure hæmorrhoids by producing a sufficiently powerful vascular effect.

Cannon has described instances of complete inhibition not only of gastro-intestinal motility but also of secretory activity of the digestive glands in consequence of emotional stress. Fear may inhibit salivary, gastric, and pancreatic secretions; anxiety or distress may profoundly disturb the entire process of digestion; obstinate constipation is familiar in melancholics. Cabot has reported the failure of a fracture to unite in consequence of the impaired nutrition resulting from worry; though a direct influence of nervous processes need not be invoked, since the inhibition of hunger contractions of the stomach incidental to emotional disturbance results in the failure to take sufficient food to ensure nutrition in general and consequently of reparative activity.

To the psychologist, so-called gastric neuroses are repressed passive wishes which, denied direct expression by the conscious personality, find a motor equivalent in gastric symptoms, and to him chronic constipation is often an expression of the patient's spiteful attitude to his environment. To the clinician's not unnatural objection he will retort that ignorance of the detailed mechanism of a causal connexion between two facts does not justify its denial. To explain the production of stomach symptoms as the longing to be loved like an infant, or constipation as repressed spite, is no more mystical than the convulsive contractions of the diaphragm and laryngeal muscles in laughter as a result of seeing a comic situation or hearing a funny story, a specious parallel which is not easily dismissed by the elementary student.

The disappearance of a multitude of symptoms after a county court settlement has an equivalent in the wonders which may follow the application of golden ointment. Many dermatoses have been shown to possess a mental or psychic basis: from the traditional rapid whitening of the hair through fear or suffering to the sensations of anæsthesia, hyperæsthesia, and the paræsthesias, with a number of eruptions of which urticaria deserves particular but by no means isolated mention.

The major part of our biological accomplishments consists of expressing and satisfying psychical needs, wishes, and emotions through motor innervations, whether as complicated movements, or whether melancholy ideas influence the secretions, or whether under the influence of strong emotions profound alteration may occur in the distribution of the blood-supply. It is of interest to glance at the idea which has been advanced of the philogenetic primacy of central and autonomic innervations. It is thereby suggested that hysterical manifestations in which organs with automatic regulatives are influenced by psychological motives can be regarded as archaic processes in which the organism regresses to a lost faculty of controlling all organic functions in the same way as the voluntary muscles are controlled—i.e., through cortical influences. That this faculty can be relearned by training is at least probable, and the practice of the yogis in India might be accepted as a method of extending the field of voluntary innervations through systematic training.

FUNCTIONAL OR ORGANIC?

Where does organic change begin? The distinction often drawn between functional and organic though frequently asserted cannot be maintained. All disease must be disturbance of function. Hughlings Jackson described asthma as a respiratory convulsion comparable to epilepsy, which suggested that the colloid molecules in the brain substance are unduly irritable and explosive. Saville, in his studies in hysteria, says that hysterical monoplegia is due to a vascular disturbance of the corresponding cortical area, such a disturbance being possible only in subjects in whom the vascular supply of the skin and the central nervous system are reciprocally unstable.

The common cold may yet come to be regarded as the outcome of depression in the affective not the hygrometric barometer, and Samuel Butler's prognostication in "Erewhon" will then be ratified. Cancer has been called insanity of the tissues, not an inapt simile if it is a disease of civilisation; and certain physicians maintain that phthisis *always* has an origin in discouragement or disappointment. Certainly the psychological state of individuals exposed to infection must be a factor in susceptibility when one appreciates that only a fraction of persons infected become actually sick, and that some variable factor must be responsible in addition to acquired immunity.

The old and vague notions of the connexion of mental disturbances and glandular functions betray themselves in expressions like melancholia (black bile). Yet the short distance we have travelled is demonstrated by the publication by Hartmann and Weissman of the use of intravenous decholin in 16 patients suffering from melancholia, in eight of whom both subjective and objective improvement is claimed. I cannot proceed further into the realm of "organ jargon," the principle that every illness is the expression of a purpose or symbol of that purpose, a sad blow to those who see in the vomiting of pregnancy an evidence of fœtal toxæmia which interruption of pregnancy alone can terminate. I suffered for two years from excessive lacrymation of the left eye which I attributed to some local peculiarity, although I confess its nature was never discovered. I am informed that I was in fact weeping, only I did not know that I was too proud to cry in the orthodox manner!

ORGAN INFERIORITY

Furthermore, it must always be impossible to separate the purely psychic effect dependent upon a feeling of inferiority when an organ has been lost, from the direct consequences either of its absence or of the operation itself. In 1907 Mr. Waggett, at a meeting of the Otological Society of Great Britain, referring to its well-known depressing effect, asked if the complete mastoid operation had not for this reason a much more profound influence on the general condition than a minor operation. There was, however, unanimous opposition to his suggestion, and I note that the same question in regard to the organ of hearing was raised about 12 months ago. Many factors operate in this connexion: the loss of hearing

and the handicap of education, the constitutional debility resulting from prolonged otorrhœa, the nervous exhaustion inseparable from the pain and fear of dressings. Small wonder that irritability, emotional outbursts, lack of concentration, bad memory, and other so-called neurasthenic manifestations develop and are with some convenience summarily explained on the lines of organ inferiority.

We note in psychiatric patients a high incidence of physical abnormalities—asymmetry, anomalies of fat and hair distribution, malformations. On the biochemical side, a tendency towards a depression of basal metabolism. And inevitably we return to the ductless glands. In high grades of thyroid deficiency, depression, illusions, hallucinations, and even compulsive states have been noted; and, although this is not so generally accepted, there is the thin irritable type of sub-thyroidism which is over-responsive to environmental annoyance.

The rôle of the gonads in determining personality has been appreciated from very early times. Ovarian deficiency is associated with accompanying fatigue, headache, irritability, and depression, with not infrequently self-pity united to bitter criticism and resentment of environmental conditions. The occurrence of profound melancholia at the climacteric in both sexes is another commonplace of the importance of gonad secretion in the maintenance of a normal psychic life. The pituitary in relation to sex functions requires no introduction. A peculiar behaviour characterised by indiscipline has been recognised as dependent upon the parathyroids. The mental and physical precocity associated with pineal tumours may be recalled.

All these psychoses related to the ductless glands have encouraged a therapeutic approach unhappily without the fruit of an early promise. Doubtless there is a medium between the bombastic claims of the vendors of innumerable organotherapeutic preparations and the salutary scepticism of Swale Vincent, but we are not far advanced from Kraepelin's conclusion of over 20 years ago. He failed to influence dementia præcox by the employment of every possible organ; to which it might be objected that negative evidence is conclusive only when it is shown that an adequate dosage of a potent preparation has been used over a sufficient period.

Look at it as you will, this psychophysical relationship in health and disease confronts us at every turn. Crile says modern man cannot even fear intellectually; he cannot fear dispassionately; he fears with all his organs, and the same organs are stimulated and inhibited as if in a physical battle with teeth and claws.

I end as I began. The modern student of medicine is buffeted to and fro by contending currents of contemporary views, and not the least turbulent and overwhelming are the psychic and the physical. Not very long ago a physician had to be reminded that his patient had a personality and a mental life with difficult and important conflicts; nowadays some physicians have to be reminded that there is also the complicated machinery of the body to be reckoned with. An uncritical pan-psychological attitude has to a considerable extent superseded the preceding non-psychological period in medicine which refused to accept Freud as a sort of Moses pointing the way to the promised land. And the conscientious practitioner finds himself at the cross-roads standing bewildered and undecided, when dealing with a certain type of patient, whether to send her stools to be analysed by a pathologist or her mind to be analysed by a psychologist.

SURGERY OF THE LUNG ROOT*

By Laurence O'Shaughnessy, M.D. Durh., F.R.C.S. Eng.

THORACIC SURGEON TO THE LONDON COUNTY COUNCIL; SURGEON TO THE BRITISH LEGION SANATORIUM, PRESTON HALL; AND THORACIC SURGEON TO THE GROSVENOR SANATORIUM

In the last ten years thoracic surgery has achieved some remarkable successes. Ten patients have survived the Trendelenburg operation of pulmonary embolectomy; in the hands of Sauerbruch a patient has survived a radical operation for an aneurysm of the heart; and not only has the mortality of lobectomy been materially reduced but some patients have survived total removal of the diseased lung. These results are important quite apart from their relation to the treatment of such comparatively rare conditions as pulmonary embolism or bronchiectasis—they illustrate the possibilities of surgical intervention for conditions once quite incurable. The present triumphs have been achieved by the patient application of the results obtained in the post-mortem room and the experimental laboratory, and there still remain many incurable diseases in the chest for which the further development of surgical technique offers the only prospect of cure. My object here is to outline some of the lesser known interventions on the lung root that will come to have an increasing importance in radical or palliative treatment.

Exposure of the Lung Root

Three approaches are available for the surgical exposure of the lung root—transpleural, anterior mediastinal, and posterior mediastinal.

A *transpleural route* has been employed by Rienhoff, who ligated the several constituents of the left lung root as an immediate preliminary to removal of the lung. Rienhoff made his incision in the third intercostal space, from the sternal border to the anterior axillary line. Kümmell used a similar approach to the nerves of the lung root in his operation for asthma. Phillips and Scott in their operation for asthma resected the fifth rib from behind after displacement of the scapula, and entered the pleura through an incision in the bed of the resected rib.

An *anterior mediastinal exposure* has been used by Kerschner and by myself in exposing the lung root in order to ligature the pulmonary vein. In my cases the second and third costal cartilages were exposed by a vertical incision, the Doyen raspatory was inserted close to the sternal border and the soft parts stripped from the cartilage. The internal mammary vessels were ligated and the pleura separated from the pericardium—separation being begun, as Meyer suggested, actually under the border of the sternum. The phrenic nerve is the first important landmark encountered, and a finger's breadth deep to the nerve the anterior surface of the lung root may be displayed.

The *posterior mediastinal approach* to expose the main bronchus was first used by Nasiloff, according to a recent paper by Terebinsky. The method is also described by Quènu (1901) and by Gluck (1907). Garré describes the method of Schwartz (1903), a pupil of Quènu. A posterior mediastinal approach to the œsophagus is described in a recent paper by Raven and myself.

* A Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 23rd.

The fifth to eighth ribs are exposed by a posterior vertical incision, as in the operation of paravertebral thoracoplasty. A subperiosteal excision of each rib for a distance of some 8 c.mm. from the costo-transverse articulation is carried out, and after ligature and division of the intercostal vessels the parietal pleura is separated from the vertebral bodies in a downward and outward direction (Fig. 1). On the *right* side the main bronchus is identified, lying immediately below the azygos vein between the œsophagus on the inner side and the separated lung and pleura on the outer side. On the *left* side the main bronchus lies immediately below the arch of the aorta between the descending thoracic aorta on the inner side and the separated lung and pleura on the outer side.

SURGICAL ANATOMY

The surgical anatomy of the lung root is comparatively simple (Fig. 2). The pulmonary veins occupy the most superficial plane, then comes the pulmonary artery, and the main bronchus is the most posterior structure. The important superficial landmark of the root is the phrenic nerve. The various structures are enclosed by pleura, but once this has been removed their separation may be accomplished fairly readily. The anterior pulmonary plexus is difficult to identify either in the cadaver or in the living patient, but the strong branches of the vagus which go to form the posterior pulmonary plexus are readily appreciated.

The *bronchial arteries* are difficult to identify, either at operation or by dissection of the fresh cadaver. The posterior group of arteries provides the main supply and usually consists of two separate vessels taking origin from the descending thoracic aorta and passing directly to the posterior surface of the main bronchus.

The *root of the left lung* contains the pulmonary artery, the main bronchus, and the pulmonary veins, in this order from above downwards. The pulmonary artery and the bronchus each pursue a course of some 5 c.mm. before division.

The *root of the right lung* contains, from above down, the upper lobe bronchus, the pulmonary artery, the continuation of the main bronchus, and the pulmonary veins. The artery to the upper lobe is given off within the pericardium and the upper lobe bronchus is given off as the right main bronchus enters the region. The importance of this early ramification of the structures in the root of the right lung has recently been stressed by Archibald in discussing the technique of pulmonectomy.

DANGERS

The special dangers associated with interventions in the region of the lung root are air embolism and serious reflex disturbance. The aspiration of even a small quantity of air into a branch of the pulmonary vein may cause death from obstruction of either the coronary or the cerebral circulation. In the event of air embolism of a peripheral vein, such as the jugular, the capillary system of the lungs forms an efficient barrier and only very gross embolism is fatal, but air which enters the pulmonary vein passes directly to the greater circulation through the left heart.

The first successful pulmonectomy in man was done by Nissen in 1931. At the moment in which the ligature was tied round the root his patient collapsed, and at first it seemed that the circulation could not be re-established. Most of the successful pulmonectomies that have followed since 1931 have passed off without this incident, but it seems clear from clinical and experimental evidence that the possibility of dangerous reflexes does attend operations in the area. Morriston Davies recommended that the vagus stem should be blocked with novocain, Heller and Weiss (1913) advised local infiltration of the operation site. I have suggestive evidence to show that high spinal anæsthesia protects the experimental animal, but when operating on the lung root in man I have so far used general anæsthesia.

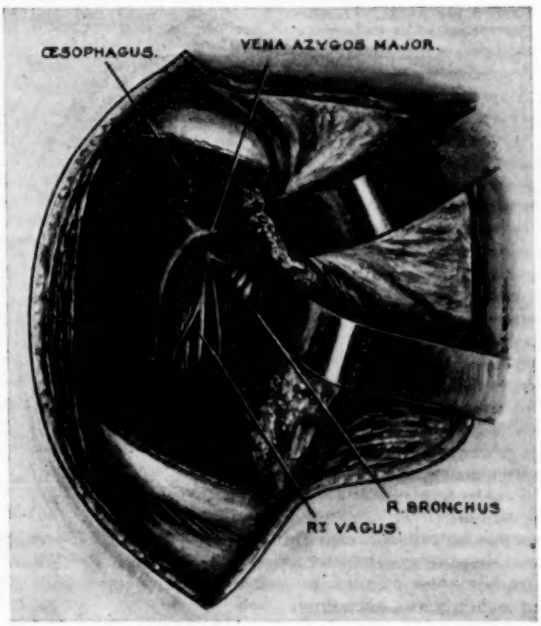

FIG. 1.—Posterior mediastinal exposure of the right main bronchus.

Operation on the Bronchus

It so happened that just as the removal of foreign bodies from the lung was becoming a practical surgical exercise, Killian and later Brüning were developing the bronchoscope, and it soon became clear that endoscopic removal was the method of choice. At the same time it may be noted that bronchotomy for the removal of a foreign body was used successfully by Duncan and by Schiasso some twenty years ago. The only recent operation of this type recorded is by Terebinsky, and his case was fatal. It is clear that at the present time there is no justification for the removal of foreign bodies from the lung in this way, but past experience has at least demonstrated that such an operation is practicable not only on the cadaver but on the living subject.

Another indication for opening of a main bronchus is obstruction of the lower air-passage by an inoperable tumour. Gluck, some thirty years ago, was probably the first surgeon to describe the phenomenon of "retrograde respiration." His patient had a bronchial fistula following an intervention for gangrene of the lung, and it was observed that, with mouth and nose occluded, respiration could be carried on through the fistula. This clinical observation was confirmed by Gluck in animal experiments. The literature appears to contain only one instance of this operation as a deliberate intervention in man. The case is recorded by Rethi-Pest; his patient carried on respiration through a fistula of a lower lobe bronchus for eighteen months.

It is now known that respiratory obstruction caused by the pressure of an aneurysm or an inoperable tumour of the mediastinum may be relieved by an operation on the bony chest wall. The patient suffering from obstruction caused by a tumour in the lumen of the trachea cannot be helped in this way, and there is one recent fatal case recorded by Mitteldorpf in which bronchostomy might have been successful. Although Gluck considered that a

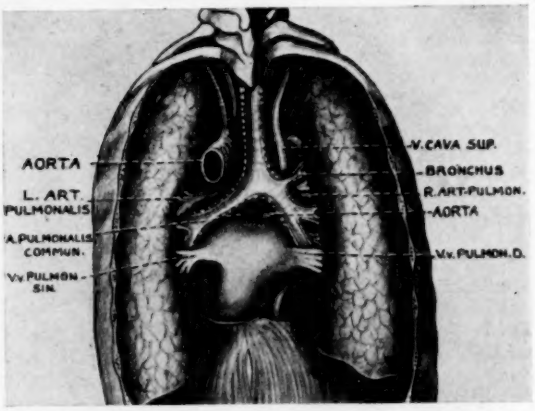

FIG. 2.—Posterior view of lung root area. (After Fig. 10 of G. von Quincke's "Lungenchirurgie," Jena, 1912.)

respiratory fistula should be established by opening a lobar bronchus, a more certain and deliberate bronchostomy could be established by opening one or other main bronchus.

Deliberate bronchostomy of a main bronchus for the palliation of widespread suppurative disease of the lung has never been suggested but is worth consideration. Clearly, a localised area of suppuration is to be opened and drained or actually extirpated. A unilateral lobar bronchiectasis or even a total bronchiectasis of one lung may be cured by extirpation, but the victim of bilateral lobar bronchiectasis is shut out from the benefit of such radical surgery. Eloesser seems to be the only surgeon to record a case of successful bilateral lobectomy for bronchiectasis, and in this case a drainage operation had been carried out on each lobe. Other surgeons have recorded improvement after drainage operations for advanced bronchiectasis, but the establishment of a pulmonary fistula as a means of treatment has never been standardised largely because the drainage so obtained has been inadequate. The difficulties of accurate localisation of a lobar bronchus are great, but it would seem reasonable to carry out a main bronchostomy and in this way, making use of a suction apparatus, provide constant drainage of the bronchial tree—which should be more effective and less exhausting than the natural drainage provided by expectoration. There are also cases of late phthisis in which a purulent bronchitis is the terminal event, and here too bronchostomy might perhaps be employed, if only as a palliative measure. When the bronchial tree is infected it would be necessary to carry out the bronchostomy in two stages—immediate incision of an infected bronchus would almost certainly be followed by a suppurative mediastinitis. At the first stage the region would be exposed by the posterior mediastinal route and a paraffin "plombe" inserted in order to ensure the local formation of adhesions. This method is used by Sauerbruch in the operative treatment of pulmonary abscess. In order to prevent the regeneration of the excised ribs, the fifth, sixth, and seventh ribs would be removed together with their periosteum. Preliminary separation of the pleura would be effected after a subperiosteal resection of portion of the eighth rib. After an interval of ten days the plombe would be removed and the posterior wall of the bronchus incised.

Operation on the Pulmonary Artery

Ligature of lobar branches of the pulmonary artery was carried out some twenty years ago by Sauerbruch in cases of bronchiectasis. Seventeen cases were done without mortality and, although he soon abandoned the method for the more radical operation of lobectomy, the changes observed in the lung were of considerable interest. Ligature of a pulmonary artery is *not* followed by gangrene of the lung, because the nutrition of the parenchyma is maintained by the bronchial vessels; what does occur is a diffuse fibrosis. This effect was observed in the experimental animal first by Sauerbruch and Bruns (1906) and later by Schlaepfer. Attempts to control bleeding from the lung by ligature of a branch of the pulmonary artery have been made, and a recent account of two cases is given by Beye. On the whole, the results have been disappointing, and in view of the anatomy of the branches of the pulmonary artery this is not surprising. Not only is there a very early division of each lobar artery into subsidiary branches, but frequently part of the lobe is supplied by branches from the artery to an adjoining lobe. Thus, although ligature of a lobar artery is enough to produce a generalised fibrosis of the lobe, it has not proved satisfactory as a method of arresting hæmorrhage.

So far as the lung root is concerned, only three vessels can be tied. It is possible to ligature the main left pulmonary artery, the artery to the right upper lobe, or the trunk common to the right middle and lower lobes. The animal will survive ligature of a main branch of the pulmonary artery, the patient will survive ligature of a main branch of the pulmonary artery together with removal of the lung, but there appears to be no record of ligature of a main branch of the pulmonary artery as an independent intervention. The immediate reaction of the experimental animal to ligature of a main branch of the pulmonary artery is remarkable in that there is no alteration in systolic blood pressure; Sauerbruch found that at least three-fifths of the total capacity of the pulmonary artery must be interrupted before signs of heart failure appeared. This adaptation depends on the readiness of the remainder of the pulmonary circuit to dilate and on the functional efficiency of the right heart. It is possible that this mechanism might fail in the case of a patient with pulmonary disease. At the same time a certain number of patients die from uncontrollable hæmorrhage from one lung, and there seems to be adequate justification for resort to ligature of the pulmonary artery in such cases. The operation would of course be entirely of the nature of a surgical experiment, for it is possible that the collateral supply from the bronchial arteries might maintain the hæmorrhage. The whole lung has been successfully removed—it has become a commonplace to remove it from active function by means of one of the collapse operations. The effect of ligature of the main artery remains the one unexplored possibility.

Pulmonary Veins

The belief that a state of chronic venous congestion in the lung might favour healing of a tuberculous

infection is very old. Almost forty years ago Otto summarised the evidence in favour of this view and in his paper he instances the relatively favourable prognosis of a patient suffering from mitral stenosis who is infected with the tubercle bacillus, provided that there is still a cardiac mechanism adequate to maintain the systemic circulation. In a recent paper (1930) Edel quotes from Romberg's "Diseases of the Heart": "The sufferer from mitral stenosis in whom there is a dilatation of the pulmonary vessels together with a decrease in rate of the lesser circulation suffers less than the normal individual from phthisis."

Experimental evidence was provided in 1911 by Tiegel, who carried out a large series (150 cases) of ligature of the pulmonary vein in rabbits and in dogs. In none of his animals did death result directly from the operation. Even when the entire venous return from one lung was occluded the animals did not show distress, although under these circumstances an acute œdema of the lung might have been expected. Tiegel then proceeded to inject his animals with living cultures of the human tubercle bacillus and found that after an interval of several weeks a process of caseation was well advanced in the normal lung, but in the lung previously subjected to venous ligature the tuberculous foci, instead of spreading, were actually healing.

Clinical application of these results was not made until 1930, when Kerschner reported the results of four operations carried out by him at the suggestion of Edel. This step was not lightly taken. Apart from the operative difficulties of exposing the lung root in the presence of massive adhesions and with the added complication of enlarged glands obscuring the area, there were two remote dangers. Œdema of

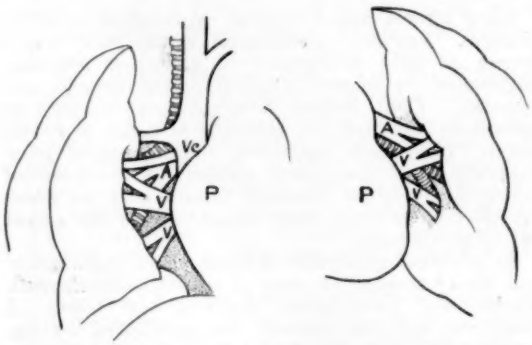

FIG. 3.—The anatomy of the pulmonary veins. P = Pericardium. A = Pulmonary artery. V = Pulmonary vein. Vc = Superior vena cava. (Modified from Kerschner.)

the lung might follow, and for this reason, apart from the technical difficulties, only the veins draining the upper lobe were tied (Fig. 3). In one case some of the lower set of veins were also ligated, but in no case was a total obstruction of the flow through the pulmonary veins produced. The second remote danger was an extension of thrombosis from the point of ligature to the left auricle, and in order to minimise this danger thick silk was used for the ligature and only moderate force employed in tying the knot.

The four operations passed off without incident; there was little general disturbance, and although arrest of the tuberculous process only occurred in one case, in two others there was marked clinical improvement.

I have myself explored the lung root in five cases of pulmonary tuberculosis and, like Kerschner, I have been struck by the slightness of the general disturbance which follows the operation. In only three cases was an effective ligature of the upper group of veins carried out. The series is too recent and too small to justify even a tentative conclusion as to the value of the operation, but two of the earlier cases—done about a year ago—although not cured have shown clinical improvement. The detailed history of one of these cases follows:—

Pulmonary tuberculosis was diagnosed in 1932, following an attack of influenza. On admission to Preston Hall in October, 1933, the patient (aged 41) was in poor condition and extremely dyspnœic, being unable to walk across the ward. There was extensive disease of the left lung with considerable involvement of the right upper lobe. His sputum was heavily positive, his weight 8 st. 10 lb., his pulse-rate 84-90, but his temperature normal. On Feb. 3rd, 1934, Kerschner's operation was performed on the left side. There was a post-operative rise of temperature to 102·6° F. Both pulse and temperature were back to normal by the seventh post-operative day. Convalescence was uneventful, and at the end of five months he was able to get up and do some light work. At this point his weight began to diminish again and in the hope of influencing the disease in the opposite lung an apicolysis was done on Oct. 12th. Recovery from the second operation was also uneventful and at present, although there is still obvious disease in the lungs, the patient feels well, is able to take six hours' recreation, has only a slight cough, and eats well. For the first time the sputum has now become negative.

It is to be emphasised that venous ligature is not an alternative operation to thoracoplasty or any other of the standard collapse operations. At the same time, a very large group of patients suffering from pulmonary tuberculosis are at present excluded from the benefits of collapse therapy and as the conservative prognosis remains so bad it seems justifiable to explore other possibilities. It is agreed that collapse therapy is the one weapon with which to attack a stationary or advancing tuberculous process in the lung, but the rationale is still a matter of dispute. The lung is excluded to some extent from active function, the walls of persistent cavities may be brought together, and there is a vascular change in the collapsed organ. A change on the vascular side can also be brought about by venous ligature, and this may be practicable when a larger operation, such as thoracoplasty, is not. Moreover, venous ligature might be effective in the type of case least amenable to collapse therapy—that is, the "exudative" case in which there is little natural tendency towards fibrosis.

Surgery of the Nerves of the Lung Root

There has been considerable dispute as to the wisdom of surgical interventions on the autonomic nervous system for bronchial asthma, but so long as there remains a group of patients whom conservative therapy fails to relieve the possibility of surgical treatment cannot be entirely dismissed. In animal experiments Braeucker showed that the effector path for bronchial constriction was over the posterior rami of the vagus which go to form the posterior pulmonary plexus. An application of this work to man has been made on very few occasions. Kümmell recorded two operations, and in his paper refers to a successful operation by Sudeck. These operations appear to have been carried out only on the right side, and this was also the case in a more recent operation recorded by Phillips and Scott. In their patient a considerable improvement followed the operation, but it would seem that a bilateral operation would be more logical, if rather severe, therapeutic measure.

Romankevic, in a paper based on cadaveric

experiments, recommended the posterior mediastinal approach for denervation of the lung root. This would seem justified only if the transpleural route was difficult because of pleural adhesions.

The recent researches of Sunder-Plassman have emphasised the functional importance of the intrinsic nervous mechanism of the lung, and, as Braeucker had already pointed out, section of the posterior bronchial nerves would leave this intrinsic mechanism intact. It would so appear that, even after section of the constrictor nerves to the bronchial musculature, allergic substances circulating in the blood stream might still produce bronchospasm. Operation should therefore be reserved for cases believed to be of neurogenic origin, and in practice no operation would be contemplated until allergic tests had been carried out.

Conclusion

It may be urged that most of these interventions have a purely theoretical basis—that none of them have been performed often enough to enable a true judgment—and, in short, that the surgery of the lung root has no real practical basis. On the other hand, four years ago it was the common opinion that total extirpation of the lung was a purely experimental procedure; many animals had survived, but no men, and the operation was never attempted. Since 1931, when Nissen demonstrated that extirpation was a practical proposition, the operation has been attempted more often. In a recent paper Archibald states that he has records of 23 cases, with 16 successes, and these figures do not include the two English cases, both by Mason and both successful. This record seems to justify the pursuit of the less radical surgery of the lung root in the hope that some help may be afforded to that large group of sufferers from chronic disease of the lung for whom conservative therapy fails to provide even symptomatic relief.

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TOXIC DIPHTHERIA

THE SIGNIFICANCE OF SUGAR-TOLERANCE CURVES AND THE VALUE OF INSULIN

BY NORMAN D. BEGG, M.D. Aberd., D.P.H.

SENIOR ASSISTANT MEDICAL OFFICER, NORTH EASTERN HOSPITAL (LONDON COUNTY COUNCIL INFECTIOUS HOSPITALS SERVICE)

With a Note by

E. H. R. HARRIES, M.D. Lond., D.P.H.

MEDICAL SUPERINTENDENT OF THE HOSPITAL

IN spite of intensive intravenous and intramuscular antitoxic therapy the prognosis of severe faucial diphtheria is still grave. In an attempt to diminish the mortality the problem has in recent years been approached from a different angle, and methods accessory to the use of serum have been introduced.

Schwentker and Noel [1] found certain metabolic errors in those suffering from diphtheria, and conceived the idea of correcting them by the administration of glucose and insulin. They summarised their findings as follows:—

1. Severe diphtheria causes prelethal hypoglycæmia. If death does not take place, the blood-sugar rises until, after the third day, a definite hyperglycæmia becomes evident.

2. There is a reduction, in most cases a complete absence, of hepatic and muscular glycogen during the toxæmia.

3. In diphtheria there is a definite reduction in ability to assimilate dextrose from the blood stream. This becomes greater as the disease progresses. The administration of insulin aids, to some extent, the assimilation of dextrose in diphtheria.

They offered the following explanation of these changes. Increased metabolism in the early stages causes a rapid breakdown of glycogen, probably augmented by increased action of the thyroid and adrenals. There follows a progressive inability to assimilate carbohydrate, resulting in a rise in blood-sugar. This, they suggested, depends upon toxic suppression of pancreatic insulin. A decrease of stored glycogen in essential tissues such as heart muscle renders them more susceptible to the action of diphtheria toxin.

As a direct application of these views, Schwentker and Noel [2] treated 14 cases of toxic diphtheria with insulin and intravenous dextrose. Of these 13 recovered and the success was attributed to the accessory therapy.

Benn, Hughes, and Alstead [3] (working under the supervision of Harries) performed a large number of sugar-tolerance curves after an intravenous test dose of dextrose. The essential abnormality found was a lag in the curve of the diabetic type. They agreed that the degree of deviation from the normal varied with the severity of the case, and suggested that some indication of prognosis could be obtained from such curves. In addition they treated 89 cases of severe diphtheria with dextrose and insulin and arrived at the conclusion that the mortality was diminished in consequence. Unfortunately, their cases were not strictly controlled, but were compared with an apparently similar series admitted earlier in the year. Moreover, since all cases were treated with both dextrose and insulin, the relative value of each could not be determined.

THE PRESENT INVESTIGATION DESCRIBED

In this investigation the value of antitoxin and of dextrose has been accepted and all patients received

both. The case for insulin not having been clearly established, it was decided to attempt to assess its value. It was also hoped that further evidence of the significance of the sugar-tolerance curves would be forthcoming. The investigation was conducted along the following lines: (1) Cases of severe diphtheria, numbering 124, were graded according to Bie's [4] classification of extent of membrane. (2) In each of them sugar-tolerance curves were estimated at various stages of the disease. (3) All the patients received intravenous and intramuscular antitoxin and dextrose intravenously and orally. (4) Half of them received, in addition, insulin in doses depending upon the sugar-tolerance tests.

Bie's classification.—Bie, in an attempt to grade diphtheria on clinical grounds, evolved two classifications. The first [4] depended upon extent of membrane and is briefly as follows:—

1. Slight membrane.
2. Not quite covering the tonsils.
3. Covering the tonsils.
4. Stretching a little beyond the tonsillar surfaces.
5. Involving part of the soft palate but not the uvula.
6. Involving the uvula.
7. Covering the greater part of the soft palate.
8. Covering the soft palate as far as the teeth and stretching forward to the posterior margin of the hard palate.

In the second classification [5] the important factor, toxæmia, received consideration. The limitations of a classification which depends upon anatomical extent of membrane are obvious, but it forms a useful basis for comparison with the blood-sugar groups. All the cases in this series fall into the sixth, seventh, and eighth group of Bie's first classification—or Group C of his second. No case with laryngeal involvement was included in this investigation. Those dying within 24 hours of admission to hospital were also excluded.

Estimation of sugar tolerance.—The dose of dextrose employed in the tolerance tests consisted of 20 g. in a 50 per cent. saline solution, administered intravenously. Examinations of blood-sugar were carried out just before, and at fixed intervals after, the injection. These intervals were 10 minutes, 1 hour, 1½ hours, and 2 hours after the administration. The blood-sugar was determined colorimetrically by Folin and Wu's micrometer method, using 0·1 c.cm. of capillary blood.

The first tolerance test was performed on admission. The next was carried out 2–5 days later. Thereafter tests were repeated at longer intervals until the curve became normal. This necessitated five or six tests in cases showing much change.

In normal persons the blood-sugar rises to about 250 mg. per 100 c.cm. after such an intravenous dose, and falls to the normal figure of about 100 mg. in little more than an hour.

Administration of antitoxin and dextrose.—After a preliminary intramuscular injection (of up to 80,000 units) concentrated antidiphtheritic serum was given intravenously in doses up to 100,000 units. The undiluted serum was slowly administered at body temperature and was followed by the test dose of 20 g. of dextrose in 50 c.cm. of saline. Whilst the dextrose was intended primarily for the purpose of the tolerance test, it also constituted the first therapeutic dose. In addition, an attempt was made to give 100 g. of dextrose daily by mouth. This was usually well tolerated, but the appearance of nausea or vomiting (as a result of the disease) was a definite indication for replacing the oral administration by the intravenous. In most cases this replacement was necessary for one reason or another at some stage of the disease, usually during the toxæmic stage. The appearance of circulatory failure was taken as a definite indication for using the intravenous route, even in the absence of nausea or vomiting. No case escaped intravenous dextrose, since at the time of each tolerance test 20 g. was introduced.

Administration of insulin.—Insulin was given to alternate cases of similar age and clinical severity in doses of 10–35 units intramuscularly, morning and evening, according to the severity of the changes in the tolerance curves. Thus a case with marked changes received as much as 70 units daily.

REACTIONS AFTER INTRAVENOUS SERUM AND INSULIN

Some reference to the unpleasant effects of treatment is desirable. Reactions due to intravenous serum were so common as to constitute the rule. They varied from simple pallor in mild cases, to rigors, vomiting, and collapse in the more severe. The severity seemed to depend directly upon the quantity of antitoxin administered. The more marked reactions are tabulated below:—

Up to	25,000 units ..	(Mild reactions only.)
,, ,,	50,000 ,, ..	15% moderate, 10% severe.
,, ,,	75,000 ,, ..	20% ,, 12·5% ,,
,, ,,	100,000 ,, ..	16% ,, 25% ,,

Anomalous reactions were seen in three cases, and consisted of wild, almost maniacal, excitement and the use of abusive language, quite at variance with the subsequent behaviour of the children. There was no loss of colour in these cases, and after a period of torpor, recovery was complete. There were no fatalities after intravenous serum. Adrenaline was withheld so that there should be no interference with the carbohydrate-tolerance tests.

Insulin gave rise to very little anxiety. In spite of the large doses, hypoglycæmia appeared to be very difficult to produce. Occasionally mild symptoms were seen, but were easily controlled. Hypoglycæmic coma occurred in one case and was successfully overcome by intravenous dextrose.

THE VALUE OF INSULIN THERAPY

The 124 subjects of this investigation, all occurring during the same epidemic period, were classified into two groups. To avoid bias in selection, alternate cases within the same age-periods and clinically of the same degree of severity were placed in the insulin and control groups respectively. The results of this classification are given in Table I. In section A

TABLE I

Showing percentage distribution of children (A) according to age, (B) according to blood-sugar grouping

A			B		
Age.	Percentage.		Blood-sugar grouping.	Controls or dextrose.	Dextrose + insulin.
	Control.	Insulin.			
0– 2 years	1·6	1·6	100–150	24·2	14·5
2– 5 ,,	27·4	27·4	..	..	..
5–10 ,,	51·7	51·7	150–250	45·2	53·2
10–15 ,,	17·7	17·7	..	..	..
15–20 ,,	..	..	250+	30·6	32·3
20+ ,,	1·6	1·6	..	..	..
	100·0 N=62	100·0	..	100·0 N=62	100·0 N=62

of this Table, which relates to the percentage distribution according to age, it will be seen that the majority of the cases were confined to the age-groups 2–5 years and 5–10 years. No less than 79 per cent. of the

controls and insulin series respectively were in these two categories. In view of the fact that the age-distribution of the two series was identical, it was unnecessary to take the question of age into account when instituting comparisons between the insulin-treated and untreated cases as regards fatality and incidence of paralyses. This allowed the analysis to be based on the total numbers in each sample (62) rather than on the smaller numbers at specific age-periods.

Although it appeared from the clinical viewpoint that the control series were equal in severity to the insulin-treated population, this, as will be seen in section B of the Table, was not demonstrated by the tolerance tests. The distribution is somewhat more unfavourable for the insulin series, as the percentage within the higher blood-sugar groups is greater than that for the controls. The blood-sugar groupings were arrived at in the following manner.

The sugar-tolerance curves always showed a deviation from the normal. This variation consisted of a rise in the blood-sugar to an excessive height, followed by an abnormally slow return to normal. In consequence, at the end of two hours the value of the blood-sugar was higher than normal. The more severe the curve, the higher this two-hourly reading tended to be. This figure was, therefore, an accurate index of the abnormality of the curve and was taken as the best single criterion of the deviation from the normal. Using this standard and taking the worst two-hourly reading, the cases were divided into three groups, for which the figures were 100–150 mg., 150–250 mg., and over 250 mg. In this paper, then, "blood-sugar grouping (B.S.G.)" refers to the worst two-hourly reading in a series of tolerance tests for each individual.

It was previously pointed out that the B.S.G. revealed a greater proportion of abnormal cases amongst the insulin-treated cases than amongst the controls. Hence, in any comparison of the results between the two series, allowance must be made for this divergency. It can be made as follows: If it be assumed that the insulin-treated cases, distributed according to B.S.G., experienced the fatality-rates which prevailed amongst the controls series for the same B.S. groups (Table II.), then the

TABLE II

Showing (1) *fatality, and* (2) *incidence of paralysis amongst controls and insulin series*

B.S.G.	Dextrose Series—Controls.				Dextrose + Insulin Series.				
						Deaths.		Paralyses.	
	Cases.	Deaths.	Case-fatality.	Paralyses and per cent.	Cases.	Actual.	Expected.	Actual.	Expected.
100–150	15	0	0	3 (20·0)	9	0	0	8	1·80
150–250	28	3	10·71	15 (53·7)	33	8	3·53	12	17·68
250+	19	10	52·63	8 (42·11)	20	7	10·53	10	8·42
	62	13	20·97	26 (41·94)	62	15	14·06	30	27·90

total number of calculated or expected deaths amongst insulin patients would be 14·06. The recorded number was 15; the difference is of no statistical significance. In like manner, the expected number of cases of paralyses amongst the insulin series should be 27·90. Actually there were 30. Again the difference is unimportant.

Hence it is obvious that, as far as these data are concerned, the efficacy of insulin in the treatment of diphtheria cannot be demonstrated. This was in accordance with the clinical impression obtained whilst the work was in progress. Since insulin has no effect, it is now possible to combine the insulin and control series and, for the purpose of subsequent calculations, to increase the size of the sample to 124 cases.

THE VALUE OF SUGAR-TOLERANCE CURVES

It was first necessary to determine if the two-hourly readings and the blood-sugar groupings constructed from them were a reliable measure of the severity of the disease.

The estimation was made using fatality as an index. The case-fatality for each blood-sugar group was calculated and the difference between fatalities in successive grades determined. The significance of the difference was measured by expressing the difference in terms of its standard error. The formula for calculating the standard error of difference is given in Table III. The ratio of the difference in fatality between two grades to its standard error must exceed 2 before it can be said to be statistically significant. When the figure is 2, the odds are 20 to 1 against the difference in fatality being due to mere chance. The first part of Table III. shows that the difference between groups is statistically significant. Therefore, *the blood-sugar groupings are a reliable measure of the severity of the disease.*

TABLE III

Showing the fatality according to grade in each of the three tests for the combined data (controls plus insulin series) and also the significance of the difference between the fatality in successive grades as a measure of the severity of the disease.

—	Cases.	Deaths.	Case-fatality.	Difference in fatality / Standard error of difference.
Blood-sugar grouping—				
100–150	24	0	0	$\frac{18·03-0·0}{10·07}=1·79$
150–250	61	11	18·03	$\frac{43·59-18·03}{8·57}=2·99$
250+	39	17	43·59	
Bie's classification—				
6th Grade	30	1	3·33	$\frac{25·88-3·33}{8·88}=2·54$
7th ,,	85	22	25·88	$\frac{53·53-25·88}{14·66}=2·02$
8th ,,	9	5	55·55	
Total antitoxin—				
75,000	36	6	16·67	$\frac{19·75-16·67}{8·38}=0·37$
150,000	81	16	19·75	$\frac{85·71-19·75}{16·47}=4·00$
250,000	7	6	85·71	

The difference between the fatality in any two grades when expressed in terms of its standard error must exceed 2 before we can say that it is statistically significant. The formula for calculating the standard error of difference is $\sqrt{SE_1^2+SE_2^2}$ where SE_1 and SE_2 are the standard errors of the case-fatality in each sub-group and are obtained from the formula $\sqrt{\frac{pq}{N}}$ where p = probability of living, q = probability of dying, N = number of observations.

To obtain some indication of how the blood-sugar method of grouping compares with other methods, the cases were reclassified in two ways and similar calculations made. In the first the cases were regraded according to Bie's first classifications; in the second they were regrouped according to the amount of antitoxin administered. From Table III. it will be seen that Bie's classification was a reliable index, whereas total antitoxin was not. An explanation of the latter fact is readily forthcoming. The amount of antitoxin administered was the one factor which depended upon the decision of a number of observers—hence the discrepancies.

Since blood-sugar groupings and Bie's classification are both reliable measures of severity, it was decided to compare them. This has been done in Table IV.

It will be seen that in no case does the ratio approach 2. Hence there is no statistical difference between the two methods; in other words, blood-sugar groupings and Bie's classification are equally sensitive indices of severity. It should be remembered, however, that we are dealing with groups and not with individual cases.

TABLE IV

Showing the result of test between blood-sugar grouping and Bie's classification to indicate severity of the disease as measured by subsequent fatality.

Blood-sugar.				Bie's classification.				Difference in fatality
Grade.	Cases.	Deaths.	Case-fatality.	Grade.	Cases.	Deaths.	Case-fatality.	Standard error of difference.
100–150	24	0	0	6th	30	1	3·33	0·29
150–250	61	11	18·03	7th	85	22	25·88	1·13
250+	39	17	43·59	8th	9	5	55·55	0·77
Total .	124	28	22·58		124	28	22·58	

SIGNIFICANCE OF ABNORMAL SUGAR-TOLERANCE CURVES

The next consideration, and probably the most important, is the significance of the grossly abnormal response of the patient with diphtheria to injected dextrose. The clinical impression obtained was that the abnormalities were associated with cardiovascular involvement, and an attempt is made below to correlate the two. The numbers are too small to permit of statistical analysis, but the evidence is suggestive.

The first point is concerned with the type of death in diphtheria. There are two main forms: the first occurs in the first three weeks of the disease and appears to be a purely cardiovascular failure; the second occurs later and is associated with severe paralyses, such as paralysis of the diaphragm. There are, however, a number of cases in which both severe cardiovascular involvement and paralyses occur together. In these it is difficult to assess the relative importance of each. There were 28 deaths in this series, and of these only 2 died with purely paralytic phenomena. It is of fundamental importance to note that in both these cases at the time of onset of the diaphragmatic paralysis the blood-sugar curve was normal. In one the test was performed on the day before death. All the other 26 died within twenty-one days and showed evidence of cardiovascular involvement and grossly abnormal tolerance curves. With the advance of the cardiovascular failure the curves showed a progressive deterioration. The average two-hourly reading increased from 238 mg. per 100 c.cm. when performed four days before death to 345 mg. when performed on the actual day of death. This suggests that the abnormal dextrose response is not connected with paralyses, but is associated with cardiovascular involvement. With the approach of death the cardiovascular failure and the abnormality of the curve increase pari passu. This is, of course, in agreement with the increased fatality-rates which have already been noted as occurring in the higher blood-sugar groups and which are recorded in Tables II.–IV., where they were used to assess the value of the sugar-tolerance curve.

Consideration of the recoveries also bears out this contention. Reference will be made to "mild" and "severe" complications. In the case of the heart "mild" will indicate the absence of demonstrable loss of compensation, and "severe" will indicate its presence. In the case of paralyses "mild" will mean isolated paralyses excluding involvement of the pharynx and diaphragm, and "severe" will indicate the presence of either of the latter or both.

Thirteen patients recovered without paralyses, but with mild heart involvement. In these the average of the worst two-hourly blood-sugars was 208 mg. per 100 c.cm. In contrast to this, 19 patients recovered with mild paralyses and no heart involvement. In these the average was 180 mg. When it is remembered that most of the readings used for the latter figure were taken in the toxæmic stage (when cardiovascular involvement is probable but not necessarily demonstrable either clinically or electrocardiographically) the difference appears significant.

Severe heart lesions were commonly combined with paralyses. When they existed together it was impossible to correlate abnormalities in the tolerance curve with either. Some dissociation was, however, possible. In 10 cases tested at the height of the severe heart lesion and before paralyses had developed the average two-hourly reading was 253 mg. per 100 c.cm., whereas in 8 cases who had recovered from heart involvement but were showing severe paralyses at the time of testing the figure was only 94 mg. If complete heart-block be taken as one example of severe heart lesions, further confirmation can be obtained. Fifteen cases (5 recoveries and 10 deaths) showed clinical and electrocardiographic evidence of this catastrophe. The average of the two-hourly readings taken when the block was established was the high figure of 311 mg. per 100 c.cm. Further,

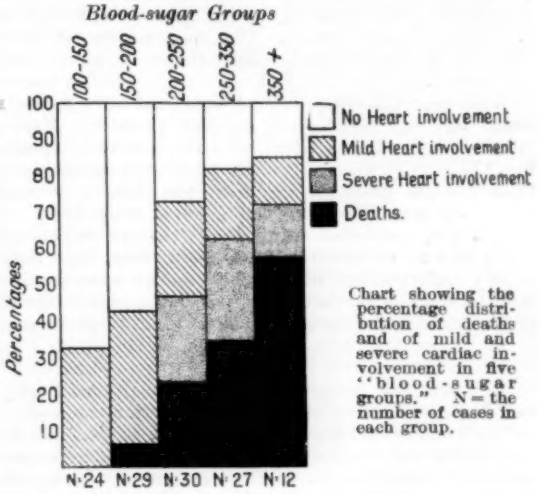

Chart showing the percentage distribution of deaths and of mild and severe cardiac involvement in five "blood-sugar groups." N = the number of cases in each group.

it was possible in 8 cases to compare curves before and after the onset of the block. In all of them the block was accompanied by a sudden and gross deterioration in the type of curve. The two-hourly readings alone showed an increase of anything from 20 to 230 mg. per 100 c.cm. It should be emphasised that this dramatic change frequently occurred in the short space of twenty-four hours.

To demonstrate graphically this association of cardiovascular involvement with altered tolerance curves, the accompanying Figure has been constructed from 122 cases. The two patients who died from diaphragmatic paralyses were excluded so that all

the remaining deaths could be attributed to cardiovascular failure, and could be used as evidence of the most severe heart involvement. The cases were divided into five blood-sugar groups on the worst two-hourly readings for each case. Each case was divided up by percentages into recoveries with no heart involvement; recoveries with mild involvement; recoveries with severe involvement; and death—i.e., with the most severe involvement of all. It will be seen that, with the increase in abnormality of the blood-sugar, there is a corresponding increase in frequency and severity of heart lesions.

The question naturally arises as to which event occurs first, whether one is dependent upon the other or whether both are due to some common factor. Schwentker and Noel [1] attributed the altered carbohydrate response to metabolic disturbances caused by the toxæmia. But the failure of insulin to compensate for the deficiency seems a potent argument against this view. In some cases in this series it was possible to observe the effect of insulin upon the type of curve. A test dose of 20 g. of dextrose was administered in the morning and a curve obtained. In the afternoon the test was repeated with the addition of insulin. The results were equivocal; some curves showed mild improvement, some were unaltered, and others actually deteriorated. This, in conjunction with the failure of insulin to affect mortality and complication rates, seems to indicate that the metabolic abnormality is not controlled by insulin.

A possible alternative theory is that the abnormal response to dextrose is directly dependent on the cardiovascular damage. Although diphtheria exerts a widespread depressed action on the cardiovascular mechanism, it is not always easy to detect. It would be of the greatest interest to know if other, and more easily detectable, heart diseases influence the tolerance curve in the same way. The attempt to correlate the two in this investigation cannot be more than suggestive.

Whatever the cause of the abnormal curves, their value appears established beyond question. Benn, Hughes, and Alstead observed that, generally speaking, the curves were of greater prognostic significance than clinical findings. Whilst the figures in this paper do not bear out the general superiority of the curves, there can be no doubt that in individual cases, and at certain stages of the disease, they may supply information which the clinical examination fails to do. They are then a reliable guide to the progress of the disease and a valuable aid to prognosis.

SUMMARY

(1) Antitoxin intravenously and intramuscularly, and dextrose intravenously and by mouth are accepted as the basis of treatment in toxic diphtheria. (2) In diphtheria the response of the body to intravenous dextrose is constantly abnormal and results in higher blood-sugar findings. The degree of variation is a sensitive index of the severity of the attack and serves as a reliable guide to the progress of the disease. (3) A fairly close association appears to exist between abnormalities in tolerance curves and involvements of the cardiovascular mechanism. How much the former depends upon the latter it is impossible to say from this investigation. (4) Insulin does not appear to change the character of the abnormal curves nor to influence the course of the disease, as judged by the fatality and complication rates.

Mr. W. T. Russell, F.S.S., of the Medical Research Council, kindly undertook the analysis of some of the figures in this investigation, and I am indebted to him for this and for the invaluable Tables (I.–IV.) which he prepared. I also wish to acknowledge my indebtedness to Dr. E. H. R. Harries, medical superintendent of the North Eastern Hospital, for his help and guidance throughout this investigation, and for permission to publish this paper.

NOTE BY DR. HARRIES

I have had the unusual opportunity, owing to a change of appointments, of observing from day to day not only Dr. Begg's work in the wards of the North Eastern Hospital but that of Drs. Benn, Hughes, and Alstead carried out in the Birmingham City Hospital and to which Dr. Begg refers. It is thus possible for me to act as liaison officer between the two groups of investigators.

The Birmingham workers compared two series of cases of toxic diphtheria: in one series the patients had all received antitoxin, dextrose intravenously and insulin; in the other antitoxin, and, in a few instances, small amounts of dextrose by the mouth only. Both series comprised patients strictly comparable as regards age-groups and very closely comparable as regards the unitage and route of antitoxin injected. The criticism has been made however that since the patients in the two groups were not actual contemporaries in the wards, that the control series of patients who received antitoxin only might not be strictly comparable, as regards clinical severity, with the test series. I had a good deal to do with the selection of the cases which should serve as the control group. They were drawn from the case records of patients admitted within a few months of the commencement of the investigation. With few exceptions the unitage and route of antitoxin injected had been decided by the senior author of the Birmingham paper, and further, the cases included all conformed, as did those in the test series, as closely as possible with the criteria of clinical severity suggested by Bie of Copenhagen. Nevertheless, in the light of the investigations of the Leeds workers on the gravis and intermediate strains of the *C. diphtheriæ*, the criticism cannot be disposed of entirely, although it may be said that no change of clinical type such as might now be associated with gravis infections was observable within the period during which both control and test series were admitted to hospital. Incidentally it may be added that either the gravis or intermediate (barred) strains were recovered by Dr. W. Mair from 90 per cent. of Dr. Begg's series.

Dr. Benn and his co-workers reached the conclusion that since the only essential difference between their two series was the injection in the second of dextrose-insulin, the factor which was responsible for the striking (and statistically significant) difference in case-mortality was the stabilisation of the carbohydrate metabolism by dextrose-insulin. Dr. Begg accepts the value of the addition of dextrose to antitoxin; all his patients received both; but, with a view to determining whether it played any useful part, only alternate patients were injected with insulin. His investigations lead him to the conclusion, which is supported statistically, that the efficacy of insulin in the treatment of diphtheria cannot be demonstrated. If this can be confirmed by others it is really a matter for congratulation because the scope of antitoxin-dextrose therapy is thus enlarged. It has always appeared to me to be quite unwise to inject insulin in diphtheria without the guidance of repeated blood-sugar estimations which are unlikely to be generally feasible. As to the value of accessory dextrose therapy in toxic

diphtheria, as in other acute toxæmias, there can be no two opinions amongst those who have observed its effects in long series of cases. To obtain the best results it must be injected, as must antitoxin, in part intravenously.

Diphtheria is a preventable disease which in course of time will doubtless be prevented, but meanwhile much still remains to be learnt by the clinician. The routine use of the electrocardiograph in the toxic case both in Birmingham and in this hospital has revealed, and continues to reveal, happenings of great interest to the observer, but it is clear that the factors which determine circulatory failure in diphtheria are manifold. No one theory of causation is adequate. Alstead, in a separate study * of the electrocardiogram in diphtheria, came to the conclusion that in the late type of circulatory failure in which complete heart-block is commonly found "deterioration of the peripheral circulatory system is of primary importance in the fatal termination of the disease." Esther Harding † showed that in diphtheria, as in cholera, there occurred polycythæmia with consequent rise of the specific gravity of the peripheral blood. In cholera, as those who are familiar with the disease are unpleasantly aware, the loss of fluid from the tissues is gross and obvious. In diphtheria Harding postulates oligæmia "especially oligæmia as it affects the central nervous system" as fundamental. The oligæmia may be "either quantitative when the blood volume is actually reduced or distributive when some portion of the blood volume is withheld from the general circulation," processes which she named "lymph-logging." Harding's brilliant work appearing perhaps at an inopportune moment when most fever hospitals were hard pressed in dealing with the post-war epidemics of infectious disease has not received the attention which it deserves. It would be interesting and possibly instructive to correlate the red cell count, checked, as in cholera, by specific gravity estimations by Sir Leonard Rogers's method with the dextrose-tolerance curves at various stages in toxic diphtheria. It may be that the concentration of the peripheral blood runs parallel with a concentration of the blood-sugar and, if this is so, a partial explanation of the lag-curve which is proportional to the degree of toxæmia may be provided. Finally it may be suggested that the neurological aspects of diphtheria would well repay expert reinvestigation. This particularly applies to paralysis of the diaphragm, for the treatment of which a Drinker respirator is now used in the North Eastern Hospital.

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ROYAL BUCKS HOSPITAL: EXTENSION APPEAL.—Over £7000 has been received or promised towards the appeal for £50,000 for the extension of this hospital at Aylesbury. The addition of a wing to the nurses' home will be the first work undertaken. The number of in-patients was 1338 last year, 132 less than the previous year, but the number of out-patients' attendances, casualties, massages, and X ray cases have increased.

EXPERIMENTAL ENDOMETRIAL HYPERPLASIA

BY A. S. PARKES, D.Sc. Lond., F.R.S.

MEMBER OF THE STAFF OF THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH, LONDON

DURING the last few years much has been learnt about the ætiology of endometrial hyperplasia by means of experimental work on laboratory animals and, finally, on women, and it is now fairly well established that the condition appears as a result of excessive amounts of œstrin acting in the absence of a corpus luteum. Burch, Williams, and Cunningham (1931) produced by œstrin injection of the mouse cellular changes of the endometrium which they considered to be entirely similar to those found in hyperplasia in women, but they were unable to produce the characteristic "Swiss cheese" gland pattern. This was, however, produced experimentally about the same time by Hofbauer (1931) who gave repeated implantations of anterior pituitary tissue to intact guinea-pigs. Later, the same effect was produced by Wolfe, Campbell, and Burch (1932), and Burch, Wolfe, and Cunningham (1932) in ovariectomised guinea-pigs by prolonged injection of œstrin, so that Hofbauer's results may reasonably be ascribed to excessive production of œstrin by the stimulated ovaries. These authors also obtained some success in castrated rats. More recently Zuckerman and Morse (1935) have obtained the result in a chimpanzee and a monkey. The relation of this condition in laboratory animals to the endometrial hyperplasia of women was conclusively demonstrated by Kaufmann (1934), who showed that the administration of very large amounts of œstrin to ovariectomised women resulted in the production of the typical "Swiss cheese" condition.

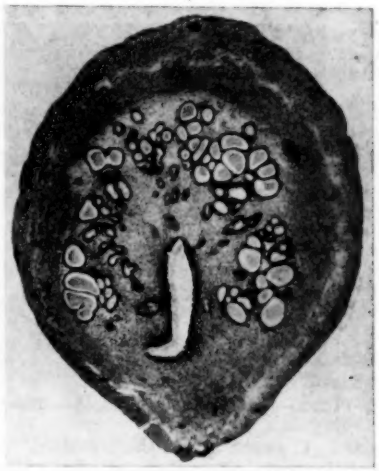

FIG. 1.—Uterus of an ovariectomised mouse after prolonged injections of œstrin, showing "Swiss cheese" hyperplasia of the endometrium, (× 23.)

Some years ago, in conjunction with Dr. G. F. Marrian, I carried out experiments on the relative amounts of œstrin required to cause the various phenomena of œstrus (Marrian and Parkes, 1929). In the course of these experiments we were led to make prolonged series of injections of œstrin into a small number of ovariectomised mice. At the end of treatment the mice showed an extraordinary condition of the endometrium, which was evidently similar to the typical "Swiss cheese" hyperplasia found in women.

The mice, eight in number, had been ovariectomised some months previously. They were given 550

mouse units (m.u.) of impure œstriol (trihydroxy œstrin) over 18 days. They were each kept with a male, and several of them mated frequently during the experiment. On killing, all showed the hyperplasia in varying degrees. The best uterus is shown in Figs. 1 and 2. The epithelium lining the glands is cuboidal instead of the pseudo-stratified type described by Burch, Williams, and Cunningham, but otherwise the picture is typically that of "Swiss cheese" hyperplasia. Since these mice received only 550 m.u. of œstrin, not a large amount in view of the normal requirements of the œstrous mouse, the condition of the endometrium must be ascribed to the duration of the treatment rather than to the amount of œstrin. In view of this it is rather curious that certain mammals, notably the rabbit, which ovulate only after mating, are able to stay in œstrus and, therefore, presumably under the influence of œstrin for long periods without undergoing endometrial changes of this kind. A second point of interest is that in certain conditions the endometrium of the normal mouse may acquire a "Swiss cheese" appearance. If one horn of the uterus is naturally or artificially devoid of fœtuses while the other horn is pregnant, then large distended glands appear in the sterile horn during the last week of pregnancy. Such glands differ from those shown in Fig. 2 in being larger and in having a flattened and atrophic epithelium (Deanesly and Parkes, 1931), but the general appearance is similar. The causation of this condition in the sterile horn has not been determined.

FIG. 2.—Part of endometrium shown in Fig. 1. (× 120.)

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SKEGNESS HOSPITAL.—The number of in-patients at this hospital last year reached a total of 391, an increase of 62 over the previous record. Patients injured in road accidents numbered 75.

SUSSEX THROAT AND EAR HOSPITAL.—The total number of in-patients during the last year was 1285 and of out-patients 1607. To meet the current expenditure money received from legacies had to be used. The number of annual subscribers is decreasing.

DISTURBANCE OF CEREBRAL FUNCTION IN CONCUSSION*

BY C. P. SYMONDS, M.D. Oxon., F.R.C.P. Lond.

PHYSICIAN FOR NERVOUS DISEASES, GUY'S HOSPITAL; ASSISTANT PHYSICIAN, NATIONAL HOSPITAL, QUEEN-SQUARE, LONDON

OF all the effects of head injury, the most interesting is the traumatic disturbance of consciousness, generally known as concussion. This state in its various phases has been the subject of much discussion and it is perhaps only natural that modern inquiry should have demanded for it an explanation in terms of intracranial hydrostatics.

It has been argued,[1] for example, that the loss of consciousness immediately following a minor head injury is the result of a severe but transient cerebral anæmia, caused by reduction of the cranial cavity owing to compression or deformation at the instant of the blow. The compression is momentary, the circulation is at once restored, and recovery is rapid and complete. Some relative delay in the process may be accounted for by the assumption of post-anæmic œdema. It is assumed that if the patient remains unconscious for any longer period than might be explained by a transient anæmia—e.g., more than 24 hours—there has been structural damage to the brain in the form of scattered and minute hæmorrhages with resultant œdema and increase of intracranial pressure. On the basis of such hypotheses, a distinction has been made between the unconsciousness of simple concussion (transient anæmia) and that of cerebral contusion (increased intracranial pressure).

These assumptions have been invalidated by the observation,[2] now many times repeated, that in cases of prolonged stupor after severe head injury the cerebro-spinal fluid pressure is frequently normal, and that even when the pressure is raised, there is no true relation between the intracranial pressure as thus measured and the degree or duration of stupor.

Clinical observation also raises difficulties in the way of accepting the dual interpretation of traumatic unconsciousness. Even in the mildest cases recovery, though rapid, is gradual, and as we follow up the scale towards the most severe we find that the evolution of the clinical picture is very much the same in all. There is a sudden loss of consciousness, followed by a gradual recovery, the rate of recovery being inversely proportional to the depth of the disturbance. Even in the most severe instances physical signs of structural damage may be absent, the intracranial pressure as estimated by lumbar puncture may be normal, and the patient may emerge from a state of unconsciousness, which has lasted as long as two or three weeks, without any residual symptoms to suggest organic injury.

THE LOSS OF CONSCIOUSNESS

There is a good deal to be said, therefore, for regarding all the degrees and phases of traumatic unconsciousness as due to a disturbance of cerebral function of uniform character but varied depth. The term concussion may usefully be retained for the whole, but we might profit from the use of clinical labels to describe its variations. At the one end of the scale is the case of minor injury in which there may be no visible evidence of unconsciousness. A man suffers a blow on the head at football. He plays on to the end of the game, but with no memory

* From a paper read to the Rugby and District Medical Society.

of what he has been doing. In such an instance the depth of the disturbance has been shallow. In Jacksonian phraseology the highest level of cerebral function only has been affected—that which is responsible for the consolidation of current experience into memory. All the levels below this are working normally. The resulting clinical picture, therefore, is that of highly coördinated activity. The terms traumatic automatism and traumatic amnesia have a useful descriptive value for such phenomena.

At the other end of the scale there is the patient who lies, perhaps for some days, in a state of vegetable activity; unresponsive except to painful stimuli, taking food from the spoon automatically, and passing urine and fæces into the bed. All levels above that of the vegetative and noci-reactive functions are out of action. Between these states there is that which has been called cerebral irritation—the uninhibited, confused, and often violent behaviour which results from disturbance of intermediate depth. Traumatic stupor for the former state and traumatic delirium for the latter are terms which have the merit of describing clinical symptoms without the implication of pathology.

A comparison of the phenomena of concussion (in the larger sense) with the effects of an epileptic explosion is interesting and perhaps instructive. As the least effect of minor epilepsy, we observe a post-epileptic automatism, which is remarkably like the traumatic automatism of the football field. At the other end of the scale we have the patient who, after a series of major epileptic attacks, presents the picture of unresponsive stupor with incontinence resembling that of traumatic stupor; and between these extremes we can, I think, find grades of post-epileptic disturbance which resemble each grade of the traumatic series. Other striking features of the traumatic state, which may equally be observed after a status epilepticus are violent delirium, fever, and bilateral extensor plantar responses. Whatever then is the disturbance of function underlying traumatic unconsciousness, it is probably of the same general nature as that which results from the epileptic explosion. In both instances cerebral function is affected as a whole, with variations in the clinical picture depending upon the depth of the disturbance. In both there is a gradual return of function from the lower levels towards the higher, memory for recent events being the last and highest function to appear. A third feature common to both is a degree and rapidity of recovery which are remarkable in relation to the severity of the preceding disturbance. After a severe post-epileptic stupor the patient is as a rule completely recovered as soon as the disturbance of consciousness has passed off, and the same event may sometimes be observed even in the most severe traumatic cases.

My attention was first directed to the latter occurrence by the case of a young man who, after three weeks' unconsciousness, refused to admit of any adverse symptoms whatever and appeared completely recovered as soon as he had regained his normal physical strength. That instances of this kind provide the exception rather than the rule is not surprising, for it is to be expected that an injury capable of causing severe concussion will, as a rule, at the same time cause structural damage of a kind that will give rise to headache, mental disability, or other symptoms. Nevertheless the exceptions are sufficiently numerous to warrant the assumption that a severe concussion does not in itself depend upon structural damage. This conclusion is supported to some extent by the observations of Ritchie Russell, who, in a large number of patients with head injury, has correlated the duration of the initial disturbance of consciousness with the persistence of disabling symptoms.

Russell, in his first paper,[3] divides his cases into three groups, according to the duration of unconsciousness after injury. Group A comprises all cases in which the duration was less than one hour; Group B those in which the duration was more than one hour and less than 24 hours; and Group C those in which the duration was more than 24 hours. 141 patients, who had been thus grouped, were re-examined at an average interval of six months after the injury. The proportion of patients in each group who had noticed no abnormal symptoms since their discharge from hospital was roughly as follows: Group A, 50 per cent.; Group B, 33 per cent.; Group C, 28 per cent.

In a further review of 112 cases [4] in which there was no question of compensation Russell records the duration of disability (period off work) up to the end of 18 months from the injury.

The analysis shows that of 41 patients who had been unconscious less than one hour, 90 per cent. returned to work in less than six months, 5 per cent. in more than six months but less than one year, and 5 per cent. remained disabled at the end of 18 months.

Of 33 who had been unconscious more than one hour but less than 24 hours, 84·6 per cent. returned to work in less than six months, 7·7 per cent. in more than six but less than 12 months, and 7·7 per cent. remained disabled.

Five patients who were unconscious for more than 24 but less than 72 hours, were all returned to work in less than six months.

Of 27 patients who were unconscious for more than 72 hours, 66·6 per cent. returned to work in less than six months, 11·1 per cent. in more than six but less than 12 months, and 22·3 per cent. remained disabled after 18 months.

It may fairly be deduced from these figures that a long duration of unconsciousness does not necessarily imply a long duration of disability.

PROGNOSIS AND TREATMENT

It appears then that concussion (the term being used in the larger sense to cover all durations and degrees of immediate traumatic unconsciousness) represents a disturbance of cerebral function which probably does not depend upon any coarse lesion of the brain, and which has a natural tendency towards a complete, and relatively rapid, recovery. If this conclusion be accepted it will have an important bearing upon the prognosis and treatment of head injuries in general. We shall have to admit that a severe and protracted concussion does not per se carry with it a bad prognosis, or the necessity for prolonged after-treatment. These will depend upon the observation in some cases of signs of local damage to the brain (such as hemiplegia or aphasia), and in others upon the symptoms (such as headache and giddiness) of which the patient complains when he regains consciousness.

These symptoms will need to be estimated and treated on their own merits. They may reasonably be regarded as evidence of structural damage (cerebral contusion), and, as Trotter [5] was the first to emphasise, they quite commonly develop after a head injury *without* concussion. In every case of head injury with or without concussion, therefore, such symptoms should be watched for, and it should be remembered that a latent interval, often of some days, may precede their development.

A question often debated is what should be the general rule for prescribing rest after a head injury.

A time-honoured tradition inculcates the need of three weeks in bed for any patient who has suffered concussion.

To this rule there are several objections. The first is that it takes no account of the patient who has suffered head injury without concussion and who also is liable to sequelæ which may demand prolonged rest. The second is that, if my argument is correct, a patient who has been concussed may have suffered no lasting damage to his brain, and may be fully recovered within a few days of regaining his senses. The third is that in practice the patient who on recovering consciousness after a mild concussion feels well, often refuses to accept the prescription of three weeks in bed, and in so doing evades further medical supervision.

It would seem then more reasonable to proceed upon the plan of treating each case on its merits. In the case of injury without concussion the patient, if free from symptoms, should be instructed to report to his doctor should he develop them. In the case of mild concussion the patient should be kept in bed for 24 or 48 hours, and should then, if symptom-free, be allowed *gradually* to submit himself to more physical effort and mental stress, being allowed, if still symptom-free, to resume his normal activities at the end of a few days—but still with the advice that he should return at once to his doctor if symptoms should develop. In cases of more severe concussion the duration of rest will naturally be longer and convalescence to the point of normal activity more gradual, but the symptom-free patient may be allowed rapidly but *gradually* to resume his ordinary way of living as soon as he is able to do so, provided always that he is instructed to return at once for treatment should symptoms develop. Should the patient from the first or at any later time exhibit symptoms such as headache, giddiness, or mental debility, rest should be increased and prolonged and convalescence retarded until he is symptom-free—and this rule should apply whether he has been concussed or not.

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PERNICIOUS ANÆMIA

A REVIEW OF FIFTY-SIX HOSPITAL CASES

BY JOHN MILLS, M.D. Manch.

PATHOLOGIST TO THE ROYAL BERKSHIRE HOSPITAL; AND

RUSSELL HERRING, M.R.C.S. Eng.

ASSISTANT PATHOLOGIST, MANCHESTER ROYAL INFIRMARY

Mr. Bradford Hill, D.Sc., recently [1] demonstrated that, following the introduction of liver treatment of pernicious anæmia, there was a sudden decline in the death-rate from this disease in England and Wales. Later, however, the death-rates of both sexes have tended to rise, slowly but progressively. In subsequent issues of THE LANCET there has been discussion as to whether this increased mortality is preventable, and it has been pointed out in this correspondence [2] that "pedigree cases" have remained well over long periods, whilst unsupervised cases have shown a high death-rate and much ill-health, and that there is abundant evidence that the full benefit of liver therapy is not being obtained.

In the records of the Royal Berkshire Hospital it has been possible to find notes of 56 cases of pernicious anæmia that have come under observation since liver therapy was adopted—i.e., between 1928 and 1934 inclusive. Here as elsewhere experience has shown that initial treatment has been an unqualified success, but our patients thereafter have tended to neglect maintenance treatment unless closely supervised. In this paper it is proposed to review briefly the histories of these cases; full details of all of them will be published elsewhere.[3]

In Table I. our cases are classified according to sex and age at the time of first coming under observation. It will be noted that there is a steady increase in incidence with advancing years, for although a smaller number of patients first report at 70–79 years than at 60–69 years, when considered in relation to the total living in the two age-groups it becomes evident that the incidence is heavier in those over 70 years of age.

TABLE I

Age-group.	20–29	30–39	40–49	50–59	60–69	70–79	80 over
Male ..	—	2	3	10	11	3	1
Female ..	1	1	3	9	6	6	—
Total ..	1	3	6	19	17	9	1

HIGH INCIDENCE IN THE AGED

We regard this high incidence as of great importance. The impression gained whilst carrying out the survey of these cases is that carcinoma is the diagnosis most frequently assigned to an aged patient who becomes progressively anæmic; the conclusion that nothing can be done follows and, as a rule, nothing is done. If all such old people were systematically examined with a view to the exclusion of pernicious anæmia a by no means negligible proportion of them would be found to be suffering from this disease and would react well to treatment, thus receiving a new lease of life. Two of our cases illustrate this point well.

The first was a woman who came under observation in early 1931, when 78 years of age. She reacted well to the initial treatment, and we are informed that now, almost four years later, she is quite well and has remained free from relapse under oral therapy.

The second, a man aged 82 years, came under observation in November, 1934. At that time the blood picture showed 1·5 million red cells per c.mm. and 35 per cent. hæmoglobin. He gave a history of a similar illness two years previously, which his doctor had diagnosed as anæmia secondary to carcinoma; no hæmatological investigations were then made. He recovered from this first attack without any specific treatment having been applied, and, when the condition recurred, pernicious anæmia was considered the most probable diagnosis. Investigation confirmed this, and five days after the institution of intramuscular liver therapy a reticulocytosis of 15 per cent. was observed. It was not possible to follow the reticulocytosis throughout its course, but it suffices to say that this patient is now making a rapid recovery in spite of his age, and when seen six weeks after the institution of liver therapy the blood picture showed 4·2 million red cells per c.mm. and 85 per cent. hæmoglobin.

THE CAUSE OF RELAPSES

From the beginning of 1934 onwards the method of dealing with pernicious anæmia cases in the Royal Berkshire Hospital was somewhat modified. Previous to 1934 patients were diagnosed, restored to normal by suitable treatment, and then discharged with instructions to attend as out-patients. In many cases the patients neglected to do this and were either cared for by their own medical attendant,

without hæmatological control, or treatment was neglected entirely. Under this régime patients not infrequently returned in second or even in third relapse. Only those relapses have been recorded which have been personally observed by us, though often the patients have given a history of other relapses which were not investigated and were controlled by resumption of neglected liver therapy. Of 37 first diagnosed before 1934 only 18 had no relapses, 10 had one relapse, 5 had two relapses, and 4 had three relapses. It was determined therefore to see whether relapses could be diminished by exercising closer supervision. With this end in view most of the cases first observed in 1934 have been persuaded to attend as out-patients at least once each month. At each attendance estimations of red blood-cells and hæmoglobin have been made and a suitable dose of liver extract administered by intramuscular injection.

It is proposed therefore to divide our cases into two groups—namely, those first observed previous to 1934 and those first observed in 1934.

Group I.—Of 37 cases observed previous to 1934, 3 cannot be traced; 9 are dead; 2 are ataxic, bedridden; 3 are ataxic, walking with difficulty; 20 are alive and well, but of these 9 have been rescued from relapse during 1934, 1 of them on two occasions; 2 give clinical history of relapse in 1934, but were not observed; 9 have been well throughout the year.

The age-distribution of the deaths was as follows: Age-group 50–59, one death; 60–69, six deaths; 70–75, two deaths.

Group II.—Of 19 cases first observed in 1934, 16 have had no relapse and 3 have had one relapse. Of 8 first seen during the period July 1st to Dec. 3rd, all reacted well to treatment but have not been under observation long enough to merit further comment. Of 11 first seen before June 30th, 1 has had no treatment since June 21st, 1934, seen in December she was still quite well; 3 received no treatment after recovery from the initial attack, and have had a relapse during the second half of the year; 7 have been seen each month for treatment and investigation, and have remained well throughout the year.

A RÉGIME OF SUPERVISION

In addition to keeping a closer watch on new cases, a survey of all the old cases has been carried out during 1934. All old cases have been communicated with and requested to attend for review. With one or two exceptions these patients have thereafter attended regularly for supervision and treatment, or alternatively treatment by the patient's own private medical attendant has been controlled by regular red blood-cell and hæmoglobin estimations carried out in the pathological department of the hospital. In Tables II. and III. are set out the results of this revised system of managing out-patients. The figures for red cells and hæmoglobin given in the right hand column are those maintained generally for each patient. Occasionally the hæmoglobin fell below 100 per cent. or the red cells below 5·0 million per c.mm. An increased dose of liver extract was then given and the hæmoglobin and red cells restored to the previous level.

TABLE II.—*Patients seen in severe relapse in 1934 and* thereafter *observed and treated continuously*

Case number.	Age.	Relapse number.	In relapse.		Under treatment.	
			Hb %	R.B.C. millions.	Hb %	R.B.C. millions.
8	66	3	35	1·6	+100*	+5·0*
26	44	1	..	2·3	+100	+5·0
30	61	1	48	1·9	96	5·0
35	75	1	42	1·4	+100	+5·0
38	33	0	27	1·0	+100	+5·0
39	61	0	40	1·6	+100	+5·0
41	67	2	75	2·6	+100	+5·0
42	56	0	35	1·2	+100	+5·0
46	72	0	32	1·4	+100	+5·0
49	62	0	63	2·1	+100	+5·0
51	50	0	85	2·7	96	4·6

* +100 per cent. or +5·0 million indicates that at almost all investigations the hæmoglobin and red blood-cells were above this level.

A consideration of Table II. shows that all cases, irrespective of age and the number of previous relapses, have been restored to +100 per cent. hæmoglobin and +5·0 million red cells per c.mm., provided they have been under treatment a reasonable length of time. Cases 30 and 51 had been under treatment one month and six weeks respectively when the figures in the right hand column were obtained.

TABLE III.—*Patients under unsupervised treatment who have been put on properly controlled treatment*

Case number.	Age.	Before control.		After control.	
		Hb %	R.B.C. millions.	Hb %	R.B.C. millions.
7	36	90	4·0	+100	+5·0
9	56	95	4·3	+100	+5·0
11	63	100	3·6	+100	4·8
16	55	105	4·2	+100	+5·0
23	67	95	3·4	+100	+5·0
25	44	96	4·0	+100	+5·0
28	64	88	3·9	+100	+5·0
32	61	90	3·5	+100	+5·0
33	23	75	3·4	+100	+5·0
34	64	85	4·0	95	4·5
44	46	100	4·5	+100	+5·0

Table III. shows that of 11 cases coming under observation for review, 6 had red blood-cell counts between 4·0 and 4·5 million per c.mm. and were therefore in need of more vigorous treatment, 5 had red blood-cell counts below 4·0 million and therefore were urgently in need of more active treatment. All these cases have responded well and benefited much by treatment and, with two exceptions, have attained +100 per cent. hæmoglobin and +5·0 million red cells per c.mm. The exceptions are case No. 11, who had never been observed to have a red cell count higher than 4·0 million since his first attack in 1929 but was raised to +100 per cent. hæmoglobin and 4·8 million red cells per c.mm. after three weeks' treatment, and case No. 34 who, in spite of most vigorous treatment, has not attained more than 95 per cent. hæmoglobin and 4·5 million red cells per c.mm.

It would appear from a consideration of the above figures that the results previous to 1934 were not satisfactory and that the patients have benefited by the closer supervision exercised during 1934. It will be of interest therefore to conclude by considering what were the factors which led to the relative failure of our treatment previous to 1934.

FACTORS AFFECTING RESULTS

The tendency in the past has been to rely almost entirely on oral treatment, and, though this is effective in most cases if pursued vigorously enough, the patients tend to get slack about it for several reasons. First of all it is distasteful to many patients. Secondly, it is not always convenient to take medicine regularly, and doses missed on this account are seldom made good at a more convenient time. Thirdly, the form of oral treatment adopted is not always the best or

most palatable. In reviewing the old cases a number were found to be relying on half-cooked liver. This is neither the most efficient nor the cheapest form of therapy and is probably the least palatable. Finally oral treatment is expensive and wasteful, since much of the active principle ingested probably never reaches the tissues.

A considerable proportion of our patients appear not to have appreciated the fact that treatment must be continuous after recovery from relapse, and some who have appreciated this point have been advised by their medical attendant to "have a rest from liver treatment." It cannot be too strongly emphasised that this is most dangerous advice because, although some of our patients have remained well for many months when all treatment has been withheld, relapse when it comes is apt to be sudden and severe.

A patient who first came under observation in October of this year illustrates this very well. This patient was first diagnosed and treated in February, 1934. After May, 1934, he received no further treatment until in October, 1934, he came for a blood count. He was strongly advised to resume treatment immediately, but he seemed to dislike the idea and was inclined not to believe that it was necessary. He permitted his doctor to give him one 5·0 c.cm. dose of Campolon in October and then disappeared. He returned five weeks later yellow, dyspnœic, with a red cell count of 2·5 million, and begging for further treatment immediately. A maintenance dose of campolon in October after being six months off treatment, even though the patient had a normal blood picture at the time this dose was given, failed to prevent a severe relapse.

Regular blood examinations cannot as a rule be made unless the patient attends hospital. It is possible for these patients to get about with red blood-cells between 3·5 and 4·0 million per c.mm. without feeling much distress. Case No. 11 illustrates this.

This patient first came under observation in 1929 and on each occasion that the red cells were counted between 1929 and 1934 they were found never to exceed 3·8 million per c.mm. Nevertheless he could get about and did not complain much, but was not able to do hard physical work. Within three weeks of starting vigorous intramuscular therapy his red cell count reached 4·8 million.

When the red cells fall below 3·5 million per c.mm. our patients begin to protest and then, and only then, if routine blood examinations have not been performed, does the doctor give more vigorous treatment. In consequence we find many patients more or less permanently below the 4·0 million level, and almost all below 4·5 million. If, however, hæmoglobin and red cell determinations are made regularly and the dose regulated accordingly, the 100 per cent. and 5·0 million levels can be maintained indefinitely. Treated in this way patients are able to undertake hard physical labour and lead the life to which they were accustomed before they contracted the anæmia.

SUMMARY AND CONCLUSIONS

The histories of 56 cases of pernicious anæmia have been briefly reviewed. It has been shown that the condition of all patients receiving uncontrolled treatment was unsatisfactory and that in every case the blood picture of such patients was improved by more efficient treatment.

It is suggested that the only practicable method of dealing with the maintenance treatment of these cases is by the formation of hæmatological clinics where dosage can be controlled by regular blood counts and hæmoglobin estimations.

It is a pleasure to thank the physicians of the Royal Berkshire Hospital for permission to publish these cases, and the many private practitioners in and around Reading for much help in tracing old patients.

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A CASE OF LEAD ENCEPHALOPATHY

BY K. C. EDEN, M.B. Lond.
HOUSE PHYSICIAN, UNIVERSITY COLLEGE HOSPITAL, LONDON

THE patient, a girl aged 17, had been a worker in red lead during a period of two and a half years. Her work was to stir the powder into a paste with glycerin and cement the porcelain insulators on to their metal cores. The family history was good, and until 1934 she herself had been in very good health.

In April, 1934, she was taken ill with abdominal pain, vomiting, and loss of appetite; these were thought to be due to gastritis. The pain, which was dull and continuous, passed off after a fortnight but returned again for three weeks in May of that year, being accompanied on this occasion by slight jaundice.

In July she developed severe headache and drowsiness. The vomiting continued, and she then began to complain of failing vision and seeing double. Towards the end of the month she had a fit and was admitted to the Staffordshire General Infirmary. She remained there unconscious for a day and a half. Physical examination at that time showed constant oscillation of the eyes, ptosis of the left upper lid, and external rectus strabismus. The fundi showed bilateral optic neuritis with retinal exudates (J. Brown). Plantar reflexes were flexor and the knee-jerks present. The pulse was slightly irregular and averaged 88 beats a minute. Blood pressure, 125/90. A meningeal cry was noted on several occasions. There were no other abnormal physical signs. The blood count at that time was: red blood-cells 4,160,000, hæmoglobin 70 per cent., colour-index 0·86, with some poikilocytosis and anisocytosis but no reticulocytes or punctate basophilia seen. The blood Wassermann was negative. A catheter specimen of urine was reported as having a specific gravity of 1020 and no abnormalities.

Hypertonic saline was administered to relieve the intense headache and the condition slowly improved. The diplopia cleared up and the ptosis and vision improved. Intention tremor of the hands was noted at this time. No sensory loss was at any time detected. She states that after discharge her vision slowly deteriorated until she became almost entirely blind, although her general health remained quite good.

In November, 1934, she was admitted to University College Hospital under Dr. F. M. R. Walshe. Her condition on admission was as follows. She was a pale, placid, sleepy girl, lying quite still in bed all day, replying fairly intelligently to questions, but never offering suggestions or manifesting much interest in her surroundings. The eyes were continually roving, and it was found difficult to get her to fix them. Her general mental state appeared to be somewhat deficient. The pupils were large and reacted very sluggishly to light, the left better than the right. The outstretched hands showed a fine tremor of the fingers. The temperature and pulse were normal, and the blood pressure 130/80. There were a few bluish marks on the gums constituting a fairly definite blue line. No other abnormal physical signs were detected.

The tentative diagnosis of lead encephalopathy was made and a number of investigations carried out. A blood count by Dr. M. Maizels showed:

Red cells ..	4,080,000	Polymorph. ..	57 %
White cells ..	6,800	Lymphocytes ..	36 %
Hæmoglobin ..	75 %	Monocytes ..	2 %
Colour-index ..	0·93	Eosinophils ..	4 %
		Mast cells ..	1 %

A count of 5000 red cells showed punctate basophilia in 0·06 %.

The blood Wassermann was negative. A catheter

specimen of urine showed very occasional red cells and leucocytes, no albumin, and no growth on culture. A radiogram of the long bones (femur and tibia) showed no lead deposits.

Ophthalmic report (Mr. Humphrey Neame): "The right visual field is nil, no perception of light. The left vision detects hand movements at one metre. Both pupils react to strong focal light, the right more sluggishly. Optic atrophy is present in both eyes with slight narrowing of the arterial lumen and sheathing of some of the main retinal veins."

Analysis of urine (Prof. C. R. Harington) on normal diet with no medication: "Three 24-hour specimens of urine were investigated, and 0·11, 0·12, and 0·35 mg. of lead found respectively. These results are of the order which one would expect from the history of the case and provide adequate chemical evidence that she must have absorbed lead in very considerable amounts."

The patient's condition remained unchanged while in hospital, and it was considered to be too dangerous a procedure to administer either ammonium chloride or parathormone with the object of mobilising the remaining lead in the body. The excretion of lead was unexpectedly high, and experimental medication might only have resulted in an exacerbation of the encephalopathy. She was discharged on Dec. 29th, 1934.

The case is remarkable in that in spite of the high excretion of lead several months after discontinuing work and unprovoked by medication, the general signs of lead poisoning were absent. The history of drowsiness, stupor, fits, and cranial nerve palsies is typical of this condition, but the abdominal pain at the beginning of the attack was never at any time "colic," and constipation does not appear to have been a prominent feature. Careful examination revealed a blue line, but there was no definite motor weakness or wasting of voluntary muscles, and certainly no wrist-drop.

The general health appeared good and no signs of nephritis were detected at any time, the blood pressure and urine remaining consistently normal. The blood count showed only a mild secondary anæmia and very slight punctate basophilia such as might be expected after the interval since she was last at work. It appears that in this case the lead which was undoubtedly the cause of the symptoms had attacked only the nervous system and the eyes, and left the other more commonly affected organs undamaged.

Thanks are due to Dr. Walshe for permission to publish the case, to the Staffordshire General Infirmary, and to those members of the staff at University College Hospital who provided reports.

MEDICAL SOCIETIES

MEDICAL SOCIETY OF LONDON

AT a meeting of this society held on Feb. 25th the chair was taken by Lord HORDER, the president, and a discussion on the

Value and Limitations of Radium Therapy

was opened by Mr. GEOFFREY KEYNES. He pointed to the wide range of methods available: interstitial needles, radon seeds, plaques, moulds, and massive irradiation. The accuracy of dosage was, he said, continually advancing. The value of radium lay in two main directions: the palliation of inoperable disease, and the avoidance or mitigation of operation in operable disease. Much could be done in inoperable cases with radium alone; many patients were enabled to live a comparatively comfortable life for a number of years after being hopeless and miserable, and some were apparently cured. It had been suggested that the effect of radium on glandular metastases was not nearly as good as its effect on the primary growth. This might be true in certain cases, but the results of radium in the axilla were excellent, infected glands often being made to disappear permanently. It was safer than radical surgery in many cases where the tissues were heavily infected with carcinoma, as when there were large glands in the axilla. In carcinoma of the mouth there were many awkward situations in which operation was difficult or impossible. Carcinoma of the larynx and maxillary antrum was now treated successfully with radium, and pure surgery in those situations was practically abolished. In carcinoma of the tongue the position was more doubtful, but neither radium nor surgery produced favourable results.

Carcinoma might occur at any point on the surface of the body and was then very radiosensitive. In most cases operations would be extensive and mutilating, and would necessitate skin-grafting or wide plastic operations. The growth could nearly always be treated successfully by means of radium alone. Inoperable carcinoma of the rectum could sometimes be made operable with radium, which was also a good palliative. The territory of operable disease was much more debatable. All surgeons were properly reluctant to discard well-tried methods, but surgical advances were nearly always in the direction of radical surgery with more mutilation. Statistics were unsatisfactory for many reasons and were not a good basis for comparison between the methods. The days were past when therapists expected a striking improvement in the survival-rate as a result of using radium instead of surgery. Like surgery, it was a local remedy and could not be expected to touch the metastases from which patients usually died. The final survival-rate would therefore not be much changed as between radium and surgery. There were, however, other considerations: the surgical treatment of breast cancer constituted what was to a debilitated patient a knock-out blow which might well shorten life and assist the progress of the disease in other parts of the body. Though the figures even after ten years did not show a substantial advantage for radium, at any rate they suggested that it was a reasonable alternative to surgery. Some recent figures had shown that in Stage 2 cases, where the primary growth was well advanced and there were secondary glands in the axilla, radium gave a better survival-rate than surgery gave in all cases of carcinoma of the breast.

The patient's point of view was more important than was usually acknowledged. Many women would rather die than have an amputation of the breast, and this attitude deterred many patients from seeking early treatment. Many other women would prefer a reasonable alternative and would seek treatment earlier if it were available. Radium was in many cases—not only of carcinoma of the breast—a reasonable alternative. Conservative surgery could often be combined with radium and many patients could be left in an almost normal condition. Patients who survived with a whole tongue did better than those who survived with only half or less. Radium was the treatment of choice in cancer of the cervix. When used within its known limitations it was capable of producing fairly

uniform results. Surgeons ought to be radium-minded, and remember that conservative surgery was not the same thing as conservatism.

Mr. E. PEARCE GOULD, speaking of limitations rather than of value, divided them into those attached to the radium itself, and those attached to the circumstances in which it was used. Radium, he said, was a local remedy, and there was no evidence for any secondary or general reaction. Some figures charted by Prof. G. E. Gask showed close correspondence between the results of surgery and of radium according to whether the disease was still local or had spread. Radium was therefore limited by the accessibility of the lesion. In cancer of the œsophagus or bladder, for example, surgical exposure was necessary. Radium could be used where surgery could bring the whole tumour within its reach. An important difficulty was that of ensuring homogeneity over a surface or throughout a mass; the physical problem had apparently been overcome and the observance of a series of rules would often overcome the clinical problem. Another limitation was that of radiosensitivity. The most sensitive growths were those in which the cells displayed the greatest reproductive activity with the minimum of differentiation, but this class of tumour was naturally quicker to disseminate. On the other hand, the dose of radium necessary to destroy an insensitive tumour in the wall of a hollow viscus might produce such a massive necrosis as to be worse than useless. The problem might be complicated by an alteration of radiosensitivity when the growth spread. Closer study of the measurement of dosage might increase the usefulness of radium by bringing a greater variety of tumours into the field of radiosensitivity.

Considering the question of what proportion of the total of cancer cases fell within the scope of radium, Mr. Pearce Gould declared that it could not for the moment be helpfully used as a curative agent for growths arising within the abdomen, leaving as debatable ground the lungs, gullet, and bladder. This eliminated it in about 45 per cent. of cases. When this limitation was accepted, the usefulness of radium might be still further restricted through the inexperience of the user or a lack of facilities, and the difficulty of defining the extent of the lesion. Treatment must be concerned with a whole anatomical region, not merely the localised growths within it. Limitation was imposed by the quantity and quality of the radium available. No centre was quite satisfied with its supply, and techniques were often changed before the results could be fairly assessed. In too many institutions the quantity was too small; the doses were extremely inelastic and treatment was only worth while for the class of cases suited to the standard dose. If teleradium gave superior results, it would be necessary to concentrate the work in those centres which possessed it. A further limitation was lack of auxiliary facilities, such as sound pathological confirmation of the clinical diagnosis. The best results could only be obtained by the team-work of radiologists, pathologists, and surgeons. Radium, again, extended its usefulness when X ray therapy was also available. A survey of the limitations pointed to the need for concentration of radiotherapy in large centres.

DISCUSSION

Mr. H. S. SOUTTAR said that it was impossible to separate radiological work from surgery and X ray therapy. Only by the association of surgeons, radiologists, and radium therapists would progress be made. It was very difficult to get a flat field, and the question was one for the physicist to solve. Radium would only succeed within the palisade which it formed. On the narrow, limited surface of the tongue a uniform field could be obtained with reasonable facility, but not in a large mass of cervical glands. These were best dealt with by deep X rays, and even better results would probably be gained from large radium units. It was often stated that if only cases of carcinoma could be seen early enough, more brilliant results could be obtained. The best results, however, were not obtained from early cases. Carcinoma of the tongue often spread to lymph glands, and so—said Mr. Souttar—if he wished for a brilliant series, he would wait till he could select cases in which such spread was not going to take place. The best results were obtained in the "second-class" group, and some of the worst cases were those treated earliest.

Mr. DUNCAN FITZWILLIAMS said the best results for radium would only be gained in the accessible carcinomas. In the non-accessible regions surgical treatment was bad because of the necessary delay in diagnosis; the comparison with radium was not therefore as bad as it seemed. The immediate mortality in radiotherapy of the breast was negligible. The change in radiosensitivity between the primary and the secondary growth only appeared in the keratinising carcinoma of the tongue. Here surgery was superior. Where block-dissection of the tongue infected the glands, the patient would die within five years. Secondary carcinoma in the axillary glands reacted to radium almost as well as, if not better than, carcinoma in any other part of the body. Radium was the best treatment for carcinoma of the glands. The radical operation on the breast was not necessary for early cases. He gave his cases surface irradiation, and sometimes interstitial radium in the axilla. Many breast cases which would have been operated on five years ago were now regarded as untouchable by the knife for fear of releasing carcinomatous cells. When left alone, the nodules appeared very slowly. Radium would not cure, but would not hasten death.

Dr. MALCOLM DONALDSON said that it would be impossible to prevent the spread of radium in small packets all over the country if eminent persons appealed for gifts of radium to the small hospitals. If the virus theory was correct, it was bad to release the virus until the body had sufficient resistance to it. High-voltage X ray machines would replace much of the present telotherapy.

Mr. JOCELYN SWAN distinguished between the glandular metastases in breast cases and those in the neck from tongue cases. The axillary growth was comparatively easily destroyed; the tongue cases required block-dissection. He advocated the use of radon for prostatic carcinoma, and agreed with the prime importance of team-work. He suggested that the new low-voltage X rays—600 V. or thereabouts—might prove very effective in superficial carcinoma where they could be applied in close proximity. The palliative value of radium was well shown in severe carcinoma of the breast. Nevertheless, of 17 cases of inoperable carcinoma of the breast, in only 6 did the breast prove microscopically to be cancer-free after radium treatment.

Mr. KEYNES, in his reply, disagreed with Mr. Souttar's paradox and adduced evidence from his personal experience that early breast cases were the most promising.

Mr. PEARCE GOULD, also replying, pointed out that some apparently advanced cases were still local and therefore hopeful. The appeal referred to by Dr. Donaldson had been for radium for three definite centres in a county, to which cases could be sent from other hospitals.

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT a meeting of this section held on Feb. 26th the chair was taken by Sir FARQUHAR BUZZARD, the President, and Prof. E. MEULENGRACHT (Copenhagen) read a paper on the

Stomach and Pernicious Anæmia

in which he described investigations localising the essential anti-anæmic factor in the pyloric glands of the stomach. When this work had started in 1933 he and his colleagues had known that the factor was produced somewhere in the stomach, was probably an enzyme, and was resorbed from the intestine and stored in the liver, kidneys, and brain. They had presumed that it was a secretion product. Great care was necessary in making preparations of the principle, which was rather labile; commercial preparations of stomach varied considerably in their anti-anæmic value. The pig's stomach had a complex anatomy; it consisted of cardiac, fundus or body, and pyloric sections. The grouping of the glands was quite different from that of the human stomach. The cardiac glands were shorter and more scattered; in this region were many lymphocytes, and sometimes lymphoid follicles. The corpus glands were tubular and closely packed, with almost no interstitial tissue. Oxyntic cells characterised this region but were absent from the base. The pyloric glands were alveolar-tubular, with sparse connective tissue. Material had been excised from each area, dried, defatted, and depolarised, to test its efficacy in pernicious anæmia. Pepsin, rennin, and hydrochloric acid were produced by the corpus glands only, and this region constituted a separately functioning unit of the pig stomach. In man the cardiac area was reduced to a small band a few millimetres wide, but in the pig it was large.

Pylorus powder gave a typical and striking effect. With corpus preparation there was no reticulocyte reaction, and there was a decrease in hæmoglobin and red cells. The dose of the powders had been 10 g. thrice daily. Corpus powder had been inactive in all experiemnts. The pyloric glands secreted the anti-anæmic factor. Results with cardia preparations in the same dose in some cases showed some increase in red cells and hæmoglobin, but slight or no reticulocyte reaction. The results were inconsistent, and difficult to interpret; the cardiac region seemed to have some anti-anæmic activity, but very slight compared with that of pyloric preparations. There was no histological reason for not regarding cardiac and pyloric gland cells as identical, but the interstitial tissue was much more voluminous in the former area, so that there was approximately 2 to 5 times less gland material. This would make it probable that the anti-anæmic activity would prove to be 2 to 5 times less—which was in fact the case. In man the pyloric glands were localised to the pylorus and hardly represented at all in the cardia. Brunner's glands closely resembled pyloric glands, and similar glands extended in the pig for 2 or 3 m. down the intestine. Brunner preparations gave a striking and typical response, like pyloric glands. These experiments gave a function to the pyloric glands, the use of which had hitherto been obscure. The cardia glands, pyloric glands, and Brunner glands in the pig were functionally identical and had a wide distribution. In other animals this gland system was more concentrated. Pernicious anæmia in man was due to failure of the pyloric gland organ, as diabetes was due to failure of the interstitial cells of the pancreas. The pyloric failure need not be associated with failure of the corpus glands in their work of producing pepsin, rennin, and acid. The presence of the Brunner's glands accounted for the fact that every gastric atrophy and gastrectomy did not produce pernicious anæmia. An important pathological task lay before workers in putting the pyloric gland function on a quantitative basis and investigating, on a suitable experimental animal, the effects of removing the entire pyloric gland area. These experiments had opened the way to the preparation of more effective extracts, administrable in smaller doses.

Dr. A. F. HURST said that the stomach must now be regarded as having two entirely distinct functions: the digestive function, which was not very important, and the very important and essential function of producing a substance necessary to blood formation and the maintenance of the nervous system. Cases of pernicious anæmia and subacute combined degeneration of the cord with free hydrochloric acid and cases of loss of gastric function without anæmia were now explained. In a few cases the hydrochloric acid returned as a result of treatment of gastritis, or spontaneously; in some of these the pernicious anæmia also disappeared, and in others liver or stomach extract were still required. He could not conceive that the same substance was responsible for both pernicious anæmia and subacute combined degeneration of the cord. There was sufficient lack of parallelism between the two conditions to convince him that there must be a "neuropoietin" as well as a "hæmopoietin."

Dr. J. F. WILKINSON said that the important deficiency was hæmopoietin and not acid, but the difficulties of testing for it were very great. The condition of achlorhydria often ran in families, with or without pernicious anæmia or subacute combined degeneration of the cord. He showed family trees where the three conditions were distributed in the family, and mentioned 170 such families of which he had records. Gastro-intestinal symptoms were common in cases of pernicious anæmia, but constipation was more frequent than diarrhœa in his series. They were due to gastric deficiency and not to the anæmia. In 60 per cent. of people with chronic diarrhœa or glossitis there was acid insufficiency, although the blood count was normal. Later, a number of these patients had developed pernicious anæmia. Patients showing these gastro-intestinal symptoms should therefore be watched, with a view to preventing pernicious anæmia. There was now no doubt that hæmopoietin was an enzyme, which acted on some unknown substance in the food to produce either the liver principle or something very like it. The principle had been produced by digesting hæmopoietin with beef. He had never seen a case of pernicious anæmia under 22, and nearly all his 628 cases had been over 30. Of these cases, 441 had had hog stomach treatment. Municipal hospital patients were keeping the mortality figures up, as they did not continue treatment after discharge. In Manchester he insisted that every patient should attend the clinic periodically, sessions being held daily. The ordinary commercial hog

stomach was given, starting with an ounce a day until the blood count was normal, and then reducing to perhaps a quarter of an ounce every three days. Of the 441 patients, 92·5 per cent. were well, 3·4 per cent. had relapsed, 3·2 per cent. had died from other causes, without anæmia, and 0·9 per cent. had died with anæmia. None had developed subacute combined degeneration when under treatment, while those who already had cord changes had shown no increase of their nervous symptoms.

Prof. L. J. WITTS said that the relation between achylia and subacute degeneration seemed to be much closer than that between achylia and megalocytic anæmia. The slight jaundice characteristic of pernicious anæmia was not seen in the megalocytic anæmias of nutritional or intestinal origin. Absence of intrinsic factor produced more widespread disturbances than absence of extrinsic factor or difficulties of absorption. Work on anæmia had seemed to him to be coming to a deadlock; more quantitative work was needed, and Prof. Meulengracht's work had exposed many interesting problems to follow up.

Dr. C. C. UNGLEY said that yeast owed its effect to the extrinsic factor, and many cases would show hæmopoietic response to large doses of yeast by mouth. This might prove a test for presence of intrinsic factor. Evidence for a neuropoietic factor was provided by the clinical phenomena and by the high incidence of subacute degeneration in cases of anæmia associated with gastric polyposis, the growths being found at the pyloric end. He cited a number of cases illustrating this, and also one in connexion with the development of hypochromic anæmia into pernicious anæmia.

Dr. JANET VAUGHAN thought that the hæmopoietic activity of Brunner's glands might explain the far higher incidence of pernicious anæmia after gastric operations when the operation included occlusion of the duodenum. The difference was striking.

Dr. PARKES WEBER referred to a patient whose blood was characteristic of hyperchromic anæmia of the pernicious anæmia type but who had no diminution of hydrochloric acid; such a case was explained by the data given by Prof. Meulengracht. On that basis, however, the ordinary doses of liver extract with iron ought to have acted very well, but they had not. Enormous doses had produced a steady improvement, and it was difficult to explain why she had not responded to ordinary doses.

Dr. WILKINSON replied that there were cases where the liver principle was normally produced, absorbed, and stored but did not come out of the liver. If the blood could be kept saturated so that the principle did not all go into the liver, some was left over for use.

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the section of surgery held on Jan. 25th, with Mr. SETON PRINGLE, the president, in the chair, Mr. J. OWENS read notes on two cases of

Gastrocolic Fistula

The first patient was a man, aged 42, who in 1922 was operated upon for perforated duodenal ulcer, gastro-enterostomy being performed 15 months later. He was seen at a time when symptoms of gastrocolic fistula had been present for about six months. The diagnosis was confirmed by washing the stomach, and, with the stomach-tube still in position, giving an enema containing methylene-blue. At operation the colon was dissected from the stomach and jejunum, the indurated margin of the fistula removed, and the opening in the colon closed. The gastro-enterostomy was then resected, the ulcer excised from the posterior wall of the stomach, and the gastric and jejunal openings closed, there being no evidence of active ulceration in the duodenum. The patient has since done very well.

The second case was that of a medical man, aged 35, who had a gastro-enterostomy in 1930, and developed symptoms of gastrojejunal ulcer three months later. When seen in 1931 he was suffering from vomiting, diarrhœa, and foul eructations, and the presence of a gastrocolic fistula was confirmed by the method used in the first case. At operation the colon was dissected out of the indurated mass, the opening in it was closed, the gastro-enterostomy was enlarged, and the ulcer was dissected from the jejunum and posterior stomach wall. Thirteen months later, however, he again developed a fistula. This time a procedure similar to that described in the first case was carried out; the ulcer was left adherent to the stomach, and, as it involved the whole circumference of the jejunum, it was necessary to divide the bowel transversely. Some of the posterior stomach wall with the ulcer was then resected, and the opening in the stomach closed. Some time after this the patient developed intestinal obstruction, due to a band. He was operated upon for this, made an uneventful recovery, and has remained well since.

The PRESIDENT said it was interesting that the first patient remained well for three years after gastro-enterostomy; symptoms of recurrent ulceration usually appeared within a year.—Mr. T. J. D. LANE thought the only easy thing about a gastrocolic fistula was the diagnosis. He mentioned the occasional occurrence of ulcers apparently primary in the jejenum.—Mr. F. J. HENRY said that the most important factor in preventing recurrent ulceration was prolonged post-operative alkalisation, and, particularly, avoidance of smoking. Gastrocolic fistula sometimes occurred, without actual ulceration, through a small segment of transverse colon being inadvertently nipped by the jejunal clamp.

Mr. LANE read a paper on recent developments in the surgery of prostatic obstruction.

JOINT TUBERCULOSIS COUNCIL.—At the February meeting of this council Dr. G. Lissant Cox was re-elected chairman for 1935, Dr. L. S. T. Burrell and Dr. S. Vere Pearson vice-chairmen, Dr. Ernest Ward hon. secretary, and Dr. G. Jessel hon. treasurer. A memorandum on the examination of contacts was further discussed. Dr. W. Brand announced post-graduate courses by Dr. Peter Edwards at the Market Drayton Sanatorium, a course at Victoria Park Hospital, and a visit to Denmark during June. The hon. secretary raised the question of short intensive post-graduate courses in tuberculosis for nurses, and several members foresaw a general demand for them. It was decided to discuss the proposal with the examination committee of the Tuberculosis Association, and to get in touch with the College of Nursing and the General Nursing Council. Improved methods of sputum examination were considered, and Dr. W. H. Tytler was asked to prepare a note on sputum examination for discussion at the next meeting. The utilisation of tuberculosis institutions as chest hospitals and the standardisation of the technique of the blood sedimentation test were discussed.

ROYAL PHOTOGRAPHIC SOCIETY.—The annual exhibition of this society will be held at 35, Russell-square, London, W.C., from Sept. 14th to Oct. 12th. The Rodman medal, presented to the society under the will of the late Dr. G. H. Rodman, a past president, will be awarded for the best exhibits of photomicrography and X ray photography. A further special award of the sum of five guineas has been offered by Prof. Woodburn Morison for the best X ray photograph exhibited.

PUBLIC HEALTH

Rural Water-supplies

ONE of the duties of public health officials is to be keepers of the public memory. Only a few months ago an outcry was going up from all over the country that our water-supplies had been shamefully neglected, that the public health was endangered, and that, in short, something must be done about it and at once. But the winter rains—which indeed still continue—have changed all that. Hence the meeting last week at the Royal Society of Medicine to discuss problems of rural water-supply was not only valuable in itself but served to keep in mind a great hygienic problem which is in danger of being forgotten. During the drought there was much talk and counter-talk of a water "grid" or distributing system comparable to the electricity grid system. Such schemes, as we noted in a recent issue (Feb. 16th, p. 402), are considered impracticable by water engineers because the cost of mains amounts to £600–700 a mile, and water is wasted if widespread schemes are adopted where local resources are available. Dr. F. R. Seymour however thought that a scheme of gathering water from the Welsh mountains and distributing it to distant parts of England should be thoroughly examined. Clearly a piped water-supply in rural areas, if it can be achieved, is as powerful an influence as the motor-bus or the wireless in inducing a population hankering after urban amenities to remain in healthier rural surroundings.

Both Colonel C. H. H. Harold (Metropolitan Water Board) and Mr. R. G. Hetherington (Ministry of Health) were strongly in favour of using and improving local water resources, which can in most cases be rendered adequate and safe at a low cost. The real difficulty in rural schemes is finance. Although the cost is not now necessarily borne by the parish concerned but may be spread over the whole rural district, and aided both by the county council and by the £1,000,000 granted by the Government, yet the parochial outlook has brought many promising schemes conceived in drought to a premature conclusion in a shower of rain. Mr. Hetherington showed the folly of such an attitude by demonstrating that with the usual levy of 12½ per cent. on the rateable value an unlimited supply of pure water could be obtained for a family in a cottage at a weekly cost of less than the price of half a pint of beer. In his interesting survey of available resources Colonel Harold suggested several of which more use might well be made. Thus the provision of a 1000-gallon storage tank will supply enough water from a cottage roof for the summer—2000 gallons for a medium-sized house. Such tanks must have a heavy well-fitting cover to protect the contents from such sources of pollution as mosquito larvæ, rats, and the small son of the house. Larger roof areas such as of churches and schools should be used as communal sources in droughts. Many simple methods of purification are available in times of drought—he mentioned the "three pit" filtration—and the Norton tube is of great value in areas with a high subsoil water level. As the late Dr. Thresh pointed out in his survey of Essex, there may be plenty of water for single houses although no single well yields a large supply.

Colonel Harold also sounded several warnings, particularly against rashly trying to increase the yield of a spring lest it dry up altogether, and against assuming that a deep well cannot be polluted. He quoted a 300-ft. well which was polluted from a source two miles away. He also condemned the assessment of the purity of any source of supply on analysis without inspection; in a survey in India 17 per cent. of sources yielding apparently pure water had; he said, to be rejected on inspection. Mr. Hetherington also stressed the waste in condemning a source on an adverse chemical or bacteriological report due to contamination by (say) rabbits. He stated that 162 rural districts and 982 parishes had been aided by the Government grant; where a scheme may mean an addition to the rates of four or five shillings in the pound such assistance is clearly needed. Consumption of water is going steadily up. That a certain amount of this is waste is shown by the fact that when the restrictions were removed last year the consumption did not return to the previous level. The general feeling at the discussion seemed to be that at slight cost with a rather more progressive outlook and with the help of the hydro-geological survey, while there was no immediate possibility of giving a piped water-supply to the six million or so persons who are now without it, yet adequate and reasonably safe supplies ought to be possible for all, even in times of drought.

The decisive rôle that a water-supply may play in a waterless area has recently been demonstrated in the Chaco war, where the Bolivians have been for years in possession of the town of Picuba without finding water, suffering terribly in consequence, while the Paraguayans are said (The Times, Feb. 2nd) to have dug wells supplying 6000 gallons an hour within ten days of its capture.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 16TH, 1935

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2872; diphtheria, 1812; enteric fever, 24; acute pneumonia (primary or influenzal), 1512; puerperal fever, 54; puerperal pyrexia, 112; cerebro-spinal fever, 22; acute poliomyelitis, 3; acute polio-encephalitis, 2; encephalitis lethargica, 9; dysentery, 33; ophthalmia neonatorum, 64. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Feb. 23rd was 4025 which included: Small-pox, 0 under treatment, 0 under observation; scarlet fever, 1272; diphtheria, 1889; measles, 10; whooping-cough, 259; puerperal fever, 18 mothers (plus 9 babies); encephalitis lethargica, 267; poliomyelitis, 3. At St. Margaret's Hospital there were 14 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London there was no death from small-pox or enteric fever, 14 (0) from measles, 9 (0) from scarlet fever, 24 (3) from whooping-cough, 51 (9) from diphtheria, 48 (19) from diarrhœa and enteritis under two years, and 83 (10) from influenza. The figures in parentheses are those for London itself.

There has been no further rise in the number of deaths attributed to influenza, the total deaths for the last few weeks (working backwards) being 83, 91, 71, 56, 58, 59, 54. This week the deaths attributed to influenza were distributed over 52 great towns, Birmingham reporting 5, Bolton 4, Bradford, Liverpool, Coventry, and Stoke-on-Trent each 3. There were 3 deaths from diphtheria at Southampton, Bradford, and Liverpool. Sunderland reported 3 deaths from measles.

The number of stillbirths notified during the week was 296 (corresponding to a rate of 46 per 1000 total births), including 49 in London.

REVIEWS AND NOTICES OF BOOKS

Oxygen and Carbon Dioxide Therapy

By ARGYLL CAMPBELL, M.D., D.Sc. Edin., Member of the Research Staff of the National Institute for Medical Research; and E. P. POULTON, D.M., F.R.C.P., Physician to Guy's Hospital. London: Humphrey Milford, Oxford University Press. 1934. Pp. 179. 12*s*. 6*d*.

OXYGEN has been used in the treatment of disease ever since the later decades of the eighteenth century. It is still not used as often or as efficiently as it should be, a neglect which may partly be explained by the high cost of the gas, the heavy containers in which it is supplied, the supervision necessary for its proper administration, and the tendency for emergency therapy to be uncontrolled and subject to changing fashions rather than scientific appraisement. In recent years much exact knowledge has been gained about the physiological action and therapeutic value of oxygen and carbon dioxide. The development of simple methods of administration has been stimulated by improvements in inhalation anæsthesia and by the increasing hazard of asphyxia in war and in industry.

Dr. Argyll Campbell and Dr. E. P. Poulton have done a useful service in collecting and digesting this information in book form, and their work should lead to a greater and more efficient use of these physiological remedies. After an account of the history of oxygen therapy, the physiology and pathology of the subject are discussed. It is shown that breathing oxygen, as in oxygen therapy, at increased pressure up to 60 per cent. of an atmosphere, increases the oxygen and carbon dioxide pressure in the tissues even in a normal animal. It is unsafe to expose a patient for a long period to a percentage of oxygen above 60 per cent., as higher concentrations are toxic, but for short periods, as in the treatment of carbon monoxide poisoning, pure oxygen may be used. The effects of oxygen deprivation are rather briefly described, and the nature of the morbid changes in the tissues and their capacity for repair might have been more fully considered. The diseases in which respiration is disturbed, or in which for other reasons oxygen and carbon dioxide therapy have been advised, are critically reviewed, the progress of the reader being facilitated by a summary at the end of each section. The dosage of oxygen is shown to be governed by the fact that a man requires during rest 250 c.cm. of oxygen per minute, and it can be controlled by analysis of the alveolar air. It is impossible to assist respiration materially by the injection of oxygen, though the injection may possibly act as a form of shock therapy or anti-infective agent. For clinical work the value of the nasal catheter and the oxygen tent is stressed. The glass funnel is absolutely ineffective, while masks are ill-tolerated by the sick. The rate of flow with catheter or mask must be at least 2 litres a minute; with a forked nasal tube and flow of 4 litres a minute the alveolar oxygen is over 50 per cent. Methods of artificial respiration are described, including the Bragg-Paul pulsator and the Drinker respirator. Dr. Poulton is obviously enthusiastic about the ingenious oxygen tent he has designed, and an oxygen therapeutic service has been started so that a tent in charge of a fully qualified physicist may be sent out at the request of any medical man. It is doubtful whether this apparatus, which must be rather frightening to even the least claustrophobic of patients, will ever rival the nasal catheter in general clinical usefulness. In oxygen therapy invention has outrun practice, and it is clear from this book that the present need is for series of controlled observations on the value of oxygen therapy in human disease.

The authors have made the whole subject of oxygen therapy available to the medical practitioner, to quote from Sir Leonard Hill's introduction, and they are to be congratulated on the production of a practical and well-written handbook.

The Child

His Origin, Development and Care. By FLORENCE BROWN SHERBON, A.M., M.D., Professor of Child Care and Development, Department of Home Economics, University of Kansas. New York and London: McGraw-Hill Book Co., Inc. 1934. Pp. 706. 21*s*.

IF this book contains little that is new, it has the merit of being written by one who has considered the more philosophic aspects of her subject, and has had many years' experience in teaching university students. Dr. Sherbon has drawn freely on contemporary scientific publication, without exceeding the limits of technical expression suitable for a normally well-educated adult audience. She expresses her indebtedness to Arnold Gesell's "Infancy and Human Growth" and Coghill's "Anatomy and the Problem of Behavior," and the influence of both is evident throughout. The continuity and integration of the development of the child is emphasised, and this in itself provides a raison d'être for an addition to the already formidable number of well-written and well-informed books for those concerned with the upbringing of normal children. A considerable number of photographs of healthy infants (many, we gather, provided by Dr. Sherbon's former students) are agreeably interposed amongst the lists of references and tables of food values. It is perhaps a pity that more of the technical illustrations were not designed specifically for this book instead of being reproduced from other publications, as in some instances the diagrams are more complex than the text warrants. We are interested to note that Dr. Sherbon considers "the present-day college-trained mother . . . the highest expression of maternal efficiency yet achieved." With this possible exception, the author has included little that is seriously controversial.

A Handbook of Ophthalmology

Second edition. By HUMPHREY NEAME, F.R.C.S., Senior Ophthalmic Surgeon, University College Hospital; and F. A. WILLIAMSON-NOBLE, F.R.C.S., Assistant Ophthalmic Surgeon, St. Mary's Hospital. London: J. and A. Churchill Ltd. 1935. Pp. 339. 12*s*. 6*d*.

OF the text-books of ophthalmology of which the student has a choice this one may be recommended for its careful exposition of the usual technique of examination of the eye and for its clearness in dealing with all the more ordinary conditions met with in the out-patient department of an eye hospital. Rare diseases are passed over lightly or ignored, but the diagnosis and treatment of common ones are thoroughly explained. The book does not profess to deal with the niceties of diagnosis or those requiring complicated apparatus such as the slit lamp. We

have detected only one slip and that on a matter of detail, in a reference (p. 207) to Schnabel's (wrongly printed Schnäbels') cavernous atrophy of the optic disc which is not associated exclusively with high myopia.

This second edition succeeds on the whole in keeping the work up to date. It would not be in keeping with its scope to give a detailed account of the theory and modern treatment of detached retina, but the importance of the new developments is recognised. There is a useful additional chapter on eye diseases in the tropics for which the writers express their indebtedness to Major Harold Williamson, I.M.S. The account of the modern conception of glaucoma is especially to be commended. From the ætiological standpoint, we read, congestive and non-congestive glaucoma are two separate diseases. The former depends on the presence in the aqueous of a histamine-like body known to physiologists as H substance, which is vaso-toxic and causes the capillary endothelium to become permeable to protein molecules. The pathogenesis of primary non-congestive glaucoma, on the other hand, is as yet not fully understood, and it is noteworthy that the almost exclusive stress that used to be laid on the blocking of the anterior chamber, and consequent interference with the drainage of the aqueous, is in the modern view only one of the factors responsible. As to treatment opinion has not altered so much, but there is still a difference between those who advocate early operation in nearly every case where the diagnosis can be established and those who will admit the legitimacy of temporising with miotic treatment in some cases. The easy style of the book and its moderate price will be additional recommendations.

Man and Woman

Eighth edition, revised. By HAVELOCK ELLIS. London: William Heinemann, Ltd. 1934. Pp. 469. 10*s.* 6*d.*

THE scientific writer who, in his old age, reviews the product of his labours, is apt to find much of it in a fossil state, rendered obsolete by that very advance of knowledge to which it has contributed. A striking exception to this tendency is furnished by Havelock Ellis, who seems to have the capacity for imparting to his works his own ever-green character. The passing decades appear to have no other effect on them than to give them a more firmly established position. Here, for instance, is a book which first saw the light in 1894 and was then "a pioneering effort" to present a view of the relative characteristics of the two sexes "that excluded any notion of superiority or inferiority on one side or the other." In the 40 years that have passed, this conception has gradually gained such general acceptance that its advocacy is no longer needed, and it might appear that this book had outlived its usefulness. Yet, in fact, its value is unimpaired by the passage of time, and the explanation of this healthy longevity is that its matter is of perennial scientific interest. It is not, and never was, a work of propaganda, or even of advocacy. Its purpose is to give an exact, detailed, and complete account of all the respects in which men and women either differ from or resemble each other. The conclusions emerge from the facts.

The sub-title describes the work as a "Study of Secondary and Tertiary Sexual Characters," the latter name being that given by the author to the numerous anatomical and physiological characters which present constant differences in the two sexes but which are neither directly related to the sexual functions nor serve conspicuously to differentiate male and female. Such differences are those of skull-form, of relationship of parts of the brain, of size and function of the thyroid, of specific gravity and number of corpuscles of the blood—inconspicuous differences, brought into view only by rigorous investigation, but of considerable interest not only to the anthropologist but also to the pathologist and the clinician. These alternative characters are examined systematically and minutely, separate chapters being devoted to anatomical regions—the head, the viscera, the pelvis, &c.—and, on the functional side, to metabolism, the senses, motion, periodicity, and growth; and four of the latter chapters deal with the mental differences between men and women. In these expositions, the facts are those furnished by the recognised authorities on the subjects treated, who are cited often at considerable length, and their statements collated, compared, and commented on by the author. Thus the book is not only a store of information gathered from books, pamphlets, papers, and other sources, but this information is presented in an orderly arrangement and its significance elucidated by the author's commentaries and conclusions; and, since the book has been revised and the matter brought completely up to date, it remains the standard work upon its subject.

It is not, however, a mere compilation; it has a definite thesis which rests upon and connects the multitude of facts. The conclusion which emerges from the whole mass of data is that whereas the notion of the "equality" of the sexes, in the sense of resemblance or identity, is biologically fallacious, there is a complete equivalence; "the two halves of the race are compensatory in their unlikeness, and . . . so long as each fails to carry its due weight in life, humanity has not attained complete development."

Nelson's Loose-leaf Living Surgery Renewal Pages

New York: Thomas Nelson and Sons. London: Waverley Book Co. (In eight volumes. £31 10*s.*)

THE last volumes of this system of surgery to be issued were reviewed in our columns six years ago (1929, i., 669). Since then we have received, as promised, many renewal pages; the latest batch to reach us consists of rewritten sections on varicose veins, ulcer, thrombo-phlebitis and post-phlebitic induration of the lower extremities, on gastroscopy and on extra-uterine pregnancy, together with certain tables of contents. John Homans, who has revised his contribution on varicose veins, has supplied a very comprehensive account of the subject. It is of interest to note, in these days when varicose vein operations have almost disappeared from many clinics, that excision is recommended as a quick and efficient treatment under well-defined circumstances which are not rare. The case for a return to excision of varicose ulcers instead of the very prolonged ambulatory treatment now in vogue should be noted. Chevalier Jackson and C. L. Jackson write the section on gastroscopy. This loses a certain amount of interest for lack of fuller information of the uses of the new Wolff-Schindler semiflexible instrument. In this country it does not seem to have been employed as extensively as its ingenuity and apparent advantages would warrant. The very long substitution account of extra-uterine pregnancy by Jennings C. Litzenberg is excellent; the pathology

is very fully considered. We are glad to see the author, at operation, recommends that as much blood as possible should be left within the peritoneal cavity to be reabsorbed; the value of this method has evidently impressed those surgeons who practise it, though it is very difficult to bring forward definite proof of its beneficial results.

It is an extraordinary achievement on the part of the editors of this loose-leaf surgery to have been able to maintain the production of renewal pages at such a high level for so many years. Assurance of the reliability of this service is the most eloquent of all recommendations of this work to the coming generation of surgeons.

Die Mikrogasanalyse und ihre Anwendung

By HEINRICH SCHWARZ, M.D., Privatdozent an der Universität Wien, em. Oberarzt der Stoffwechselabteilung des Krankenhauses der Stadt Wien. Vienna and Leipzig: Emil Haim. 1935. Pp. 286. RM.21.

THE title of this work is hardly broad enough to indicate its scope, which is not restricted to micro-gas analysis. The inclusion of descriptions of apparatus devised by Haldane, Hempel, and Lunge is justified, since the basic principles underlying the use of these pieces of apparatus are embodied and extended in the micro-methods proper, which require in some cases as little as a cubic millimetre of gas for analysis. A chapter is devoted to the cleaning and calibration of apparatus and to the general principles of gas analysis before the main subject is attacked. Descriptions of analysis are divided into two main sections, volumetric and manometric, the latter being mainly devoted to the adaptable apparatus of Van Slyke and Neill. The author has included a useful chapter dealing with qualitative tests for gas commonly encountered in the laboratory, and a list of gas absorbents in which their limitations as well as their special uses are indicated. Medical, biological, and chemical workers are catered for, but so rapid and important have been the applications of micro-gas analysis to physiological chemistry that whole sections of the book deal with this subject. Manometric methods in particular have been employed, not only in the analysis of body fluids using Van Slyke and Neill's apparatus but in the modified Barcroft's apparatus applied by O. Warburg to tissue and cell metabolism.

The great strides made in micro-gas analysis in recent years are well reflected in this book.

Heredity, Mainly Human

By ELDON MOORE, lately Chief Officer of the Imperial Bureau of Animal Genetics; Editor of the "Eugenics Review." London: Chapman and Hall. 1934. Pp. 343. 15*s*.

THIS fairly substantial volume differs from most of the larger works on heredity in several respects; it is not a text-book addressed to the student of genetics, but neither is it, strictly speaking, a popular book. It is designed for "the educated and intelligent reader who knows nothing of the subject but wishes to understand its main outlines without intending to pursue it much further"; and in the interests of that type of reader strenuous efforts are made in the earlier chapters, which deal with the mechanism of heredity, to present a simplified description of the complex series of changes whereby the primitive germ-cell becomes at length transformed into the completed zygote. The simplification is achieved—or at least attempted—by the elimination of "technical jargon" and a picturesque presentation of the movements of the chromomeres and chromosomes in the guise of military manœuvres. It is doubtful whether this lively and unconventional method of exposition, though aided by some excellent two-colour diagrams, has any real advantage. The complexity is in the matter, not in the terminology, and the employment of allegory may, in the case of readers to whom the matter is new and strange, be misleading. The special value of Mr. Eldon Moore's book, especially to the lay reader, is not in its treatment of the essentials of heredity, but in the completeness with which the various corollaries and applications of the subject are discussed. The endocrine glands, physique and character, inbreeding, heredity and environment, the inheritance of ability, intelligence and social class, racial poisons, and mental tests—to mention only a few of the subjects dealt with—are of far more interest to the general reader than minute details of the behaviour of chromosomes. And these derivatives of heredity, which in the more technical text-books must be either passed over or treated quite briefly, are here set forth at length as forming the main subject of the book. As the title suggests, the facts of heredity are considered chiefly as they affect man; but from time to time, the author's special experience in animal genetics is used very effectively. The results of in-breeding, for instance, can be observed and tested by experiment in the domestic animals with an exactness that is obviously impossible in the case of man; and, in cattle, the mode of transmission of particular genes, as shown in coat-colour, horns, or milk-yield, can be watched and controlled and the genetic facts ascertained with precision—facts which thus become available for the settlement of disputed questions of human heredity.

Mr. Eldon Moore has made an acceptable contribution to the literature of a subject which is coming more and more to occupy the attention of all thoughtful persons. The exposition is aided by a number of excellent diagrams, including a pedigree chart of the inheritance of amentia.

"MALIGNANCY AND EVOLUTION."—This book by Mr. Morley Roberts, which was reviewed in THE LANCET (1926, i., 443), has now been issued by the publishers, Messrs. Grayson and Grayson, in a 5*s*. edition. In a preface Mr. Sampson Handley commends it as a great and serious contribution to the subject. He adds that it should enable the biologist and the physiologist to see that the further understanding of malignancy awaits essential contributions which they alone can make and should stimulate them to set about their work.

Dr. Norman Haire writes, in reference to a statement in the review of Adolescence and Marriage by Dr. R. V. Storer, which appeared in our columns last week, that the book is not published as one of the series of the International Library of Sexology and Psychology. The book, he says, although published by the same firm, was issued independently and not as a volume in the International Library.

GLASGOW VICTORIA INFIRMARY.—The annual report of the Glasgow Victoria Infirmary shows that the annual expenditure is now over £72,000. In the past year the number of patients treated was 9532. The maintenance funds show a deficit for 1934 of £18,728.

THE LANCET

LONDON: SATURDAY, MARCH 2, 1935

SECONDARY PEPTIC ULCERATION

SECONDARY ulceration at or near the site of an operation on the stomach is a serious condition; it is painful and disabling and usually calls for drastic surgery. Its mortality is high with or without treatment; thus the recent report of an inquiry by the Association of Surgeons [1] speaks of 104 deaths in 467 cases, or 22 per cent. If nothing is done the symptoms are progressive; but the general results of operation are also far from good. These are the facts as they appear to-day, and in face of them it is obviously very important to understand the cause of this complication and learn how to prevent it. Yet even a knowledge of its incidence is not readily obtained. In forming his judgment the surgeon has two main sources of information: first, a proportion of his patients return to him with symptoms which he diagnoses as due to secondary ulceration; secondly, he sees a certain number—possibly a larger number—whose primary operation was done by someone else. The assessment of his own cases tends to be unreliable because it is governed by his personal decision as to what symptoms should be attributed to gastrojejunal ulceration, and also because the patients' histories may not be followed long enough; the incidence of secondary ulceration increases with the number of years over which a group of cases is traced. How then are we to form any idea of the proportion who return to the original surgeon when their symptoms reappear? A. J. WALTON'S [2] opinion is that the majority do so return, whereas W. H. OGILVIE, in the address we published last week, shows himself equally sure that the patients usually put the greatest possible distance between themselves and the man who operated on them first. Doubts of this kind materially affect opinions about the fate of the "untraced" cases, which are apt to form a substantial part of recorded series. OGILVIE believes that these are largely made up of the "dead and disillusioned," whereas the surgeon who confidently expects his failures to return to him may be tempted to put the untraced among his successes. WALTON'S own observations are here exceptional, for he has been able to follow the after-history of all his patients operated on since 1919; but the report of the Association of Surgeons leaves a third of its cases unaccounted for.

On two questions there is unanimity: gastrojejunal ulceration is most often a sequel to gastro-enterostomy for duodenal ulceration; and it rarely follows partial gastrectomy. Nevertheless the discrepancy in the figures of different observers is remarkably wide. GARNETT WRIGHT, in his analysis of the Association of Surgeons' inquiry, gives 8·6 per cent. as the incidence after operation for duodenal ulcer; WALTON, at a meeting of the Medical Society of London [3] last April, gave 3·9 as the highest possible percentage; and now we have OGILVIE'S estimate of at least 20 per cent. after gastro-enterostomy for duodenal ulcer. The results of the comparatively few cases treated by methods other than gastro-enterostomy differ with the particular type of operation, and pretty well cancel one another, so that the discrepancy in the total figures must be explained by the interpretation that is put on untraced cases and by the increase in incidence as the period after operation grows greater. Duodenectomy and limited gastrectomy as employed by FINSTERER and advocated in this country by C. A. PANNETT [4] has not yet been employed widely enough to influence the general results. Where the original ulcer is gastric, not duodenal, another difficulty arises. Most surgeons hold that secondary ulceration is much less common after operations for gastric ulcer, but in GARNETT WRIGHT'S figures *gastro-enterostomy* for this condition was followed by gastrojejunal ulceration in 10·4 per cent. of cases. His explanation is that the pyloric lesion, which in ætiology, complications, and treatment may be included in the same category as duodenal ulcer, almost certainly figures very largely in these results. The percentage incidence over all types of operation for gastric ulcer is only 4·5 per cent., while resection and partial gastrectomy for gastric ulcer, considered together, give an incidence estimated at from 0·4 per cent. (WALTON) to 1·3 per cent. (GARNETT WRIGHT). For partial gastrectomy alone it is small, but not quite negligible; thus WALTON has had 2 cases after 469 partial gastrectomies, and he quotes A. F. HURST as having treated 3 at the New Lodge Clinic, and as having seen reports of 14 others. At the Medical Society discussion J. A. RYLE said he thought it would be some years before we could assess the final benefits of this increasingly frequent operation.

The cause of gastrojejunal ulceration is closely bound up with the cause of primary gastric and duodenal ulceration. The only factor in its ætiology which has so far proved to have much significance is high gastric acidity, and OGILVIE thinks that this is the factor of real importance, and that it can be prevented by refusing to perform gastro-enterostomy when acidity is high. Here it is noteworthy that ulcer is very rare after the permanent reduction of acid secretion which is brought about by high gastrectomy, and that it is never seen after operations for carcinoma, in which disease the secretory function of the mucosa has been reduced or abolished. The failure to prove the presence of hyperchlorhydria in so many cases of secondary ulceration may be attributed to the onset of gastritis after the ulceration rather than to absence of acidity while it was developing;

[1] Brit. Jour. Surg., January, 1935, p. 433.
[2] Ibid., July, 1934, p. 33; see also THE LANCET, 1934, ii., 370.
[3] THE LANCET, 1934, i., 890; also Trans. Med. Soc. London, 1934, lvii., 241.
[4] THE LANCET, 1934, ii., 1306.

also, ROSCOE GRAHAM and S. I. LEWIS [5] suggest that error may arise through not ensuring that the tube is actually in the stomach, and not in the jejunum, during withdrawal of gastric contents for analysis. All things considered, it seems that faulty selection of cases and faulty judgment must be considered the chief causes of failure in gastrojejunostomy.

THE VOLUNTARY MENTAL PATIENT

THE National Council of Mental Hygiene have issued a series of recommendations for the treatment of voluntary patients under the Mental Treatment Act, 1930. These recommendations, published in our pages last week, represent the outcome of deliberations by a number of committees on which sat superintendents of mental hospitals, assistant medical officers, psychotherapists of various schools, mental hospital visitors, justices of the peace, and social workers. They can therefore be taken as embodying social as well as purely medical and administrative points of view. Examination of the recommendations (THE LANCET, Feb. 23rd, 1935, p. 472) shows that something more is intended than the making of adequate provision for the treatment of voluntary patients. Thus the last recommendation suggests the establishment of a teaching hospital with a professor of psychiatry at its head in every university town; No. 7 is concerned with the breaking down of popular prejudice against mental hospitals; No. 4 with the limitation of the proposed treatment to those who are amenable to active psychological or physical intervention; and indeed the whole series of recommendations envisages an expenditure on buildings and staff which would scarcely be justifiable if it were designed only to provide better facilities for the treatment of a proportion of those who might voluntarily seek institutional care. It is inadvisable to regard the problem of voluntary treatment out of its setting in mental illness as a whole. If we consider the ends which should be kept in view in any large scheme for the more active institutional treatment of mental disorder, it seems that certified patients should not be excluded from its benefits; many of them are accessible to remedial measures. It would be very welcome if recommendation No. 3 as to the grading of patients could be generally carried into effect in mental hospitals, irrespective of the erection of treatment centres or not. Many of the objections to voluntary treatment on the part of patients rest on the apprehension that they will be forced to associate with others grossly insane, and the recommendation states succinctly that in the treatment unit contemplated it should be arranged that "the disturbed patient should not be in proximity to the patient in need of rest and quiet."

The chief ends of mental hygiene must be, for voluntary as for certified patients, adequate treatment by an active well-trained staff and, as regards the patients, there must be willingness to avail themselves of such treatment. The authors of the recommendations sponsored by the Council of Mental Hygiene are clearly well aware of this, but somewhat confuse the issue by stating that it would be inexpedient at present to provide accommodation for the voluntary patients other than at the treatment unit of the mental hospital—recommendation No. 6. However true this may be of some counties, there is already plenty of evidence that in larger centres of population a special hospital for the treatment of voluntary patients would serve a very valuable purpose. The last two recommendations of the Council seem to take account of this, but the authors are content to postpone action. The problem of avoiding any stagnation or inertness in treatment is, it may be inferred, to the fore in the recommendations; both the building and the staff are to be detached from the rest of the hospital; the energies of the medical officer in charge of the treatment are not to be dissipated by having to supervise the welfare of chronic patients or by being burdened with administrative duties (recommendation No. 5); his assistants are to be part-time workers, presumably not concerned with the rest of the hospital. But under such conditions it is hardly likely that the completely isolated treatment unit will be a centre influencing for good the rest of the hospital; rather will it tend to create or accentuate a vicious distinction between the care and the treatment of the mentally disordered. The training of the medical staff and the maintenance of energy in treatment can better be ensured by close contact with centres of teaching and research than by setting up in the grounds of the mental hospital an independently staffed treatment unit for voluntary patients. It may be supposed that, so far as active treatment is aimed at, a rearrangement of duties within the mental hospitals, whereby the junior physicians should not be given only advanced or irrecoverable cases to look after, and the appointment of a clinical director who should not be the administrative head of the hospital, would do more to keep alive the stimulus supplied by contact, or better by definite nexus, with a university psychiatric clinic than would a detached treatment unit within the grounds of the mental hospital. In the circumstances of such improved organisation it would not be difficult to obtain the services for the mental hospital of promising and enthusiastic young physicians, or to retain those with wide experience and advanced post-graduate training. Part-time appointments as contemplated in recommendation No. 5 might prove compatible with the general requirements of mental hospital staffing and would become an additional incentive to energy and keenness.

There is already available in England a considerable store of experience in regard to voluntary treatment. At such institutions as the City of London Mental Hospital the admission of voluntary patients along with certified ones has been practised for many years with success, and in several counties since the passage of the Mental Treatment Act the number of voluntary patients admitted to mental hospitals has risen steadily; the obstacles to fuller use of the voluntary clauses of the Act

[5] Jour. Amer. Med. Assoc., Feb. 2nd, 1935, p. 386.

lie chiefly in administrative arrangements outside, and to a less extent inside, the hospital, rather than in the reluctance of the public to avail themselves of the advantages offered. In the Maudsley Hospital London has for over a decade had a university psychiatric clinic in which the provision of adequate treatment on a voluntary basis, both for in-patients and out-patients, has been successfully conjoined with teaching and research. The difficulties that arise from a prejudiced attitude by the public have in this instance proved negligible, and it is the establishment of many more such hospitals that is implied in the 11th and perhaps also in the latter part of recommendation No. 10. The Council, however, seem to say that the director of the clinic, who is also to be professor of psychiatry in the university, should devote only part of his time to these duties. The propriety of this as a final arrangement may be questioned; as in other branches of medicine, whole-time work must be regarded as the most desirable condition for such a post, except as a temporary measure.

THE DETECTION OF LEAD POISONING

THE incidence among adults and children of an acute type of encephalitis of which the origin has not immediately been recognised has been reported in recent years from places as far apart as Queensland and Canada and the United States. Often the patients have been admitted to hospital in a convulsive state and have not been diagnosed until after death, when post-mortem evidence of lead poisoning has been detected. The difficulty of making a diagnosis and the consequent lack of any definite indication as to the treatment required seems to have led to a number of avoidable fatalities. In adults with acute encephalitis, such as the case reported by Dr. K. C. EDEN on another page, inquiry as to the trade pursued may reveal occupational exposure to lead. But in children, whose poisoning has usually been caused through lead paint, licked from veranda railings or other objects, there may be no indication of the origin of the alarming symptoms. It is largely in response to the demand created by the incidence of these puzzling cases that several new, highly sensitive and rapid procedures have been elaborated during recent years for the identification of lead in blood, spinal fluid, and urine. Of the older chemical methods that introduced by L. T. FAIRHALL,[1] which involves entrainment of the lead on calcium phosphate, precipitation as sulphide, and a final iodimetric determination, has long been the standard procedure and is still commonly used. It takes a long time to work and is somewhat cumbersome. The "hexanitrite" precipitation of lead provides a more sensitive means of detecting the element, but this test is only qualitative and gives but a rough indication of how much lead is present.

The introduction of spectographic methods in chemical analysis and their more frequent adaptation to biochemical purposes offer a more delicate and perhaps more accurate means of determining lead in biological material. Many spectrographic methods, both qualitative and quantitative, have been described, and use has been made of both spark and flame spectra. These procedures require a highly specialised technique, and in respect of the time taken by the analysis have little advantage over chemical methods. BLUMBERG and SCOTT[2] have now, however, introduced a spectrographic micro-method for the detection of pathological lead in peripheral blood which, they claim, takes only 30 minutes to perform and is easily carried out when once the technique has been mastered. It requires three specimens of blood from the finger, each only 0·1 c.cm. in volume, and it promises to be of particular value in the rapid differentiation of lead encephalopathy from other possible causes of convulsions. The very small amount of blood needed shows the extreme sensitivity of the method: as little as 0·05 γ of lead (1 γ = 0·001 mg.) can be detected. The authors claim that a positive result "indicates lead poisoning, or an early stage of convalescence from it"; but consideration of the results obtained by R. A. KEHOE et al.[3] throws some doubt on the justification for this conclusion. According to these observers, who have made numerous tests on the blood of normal persons, lead is an almost invariable constituent of the blood and excreta of all humans, even under "natural conditions" among the Indians of remote parts of Mexico which have been little touched by civilisation. Obviously it is important to ascertain the limits of the normal level of lead in the blood of both infants and adults. KEHOE, F. THAMANN, and J. CHOLAK[4] have recently published the results of tests on 71 medical students. The mean value found corresponds to 0·06 mg. of lead per 100 c.cm. of blood. This amount is equivalent to 0·06 γ in 0·1 c.cm., and it is noteworthy that its presence would give a positive result in the test for lead encephalopathy devised by BLUMBERG and SCOTT. It may be that there is more lead in the blood of normal adults than of the infants studied by BLUMBERG and SCOTT; further tests on normal infants will doubtless clear up this point.

While it is possible that spectrographic methods may in the end largely displace chemical procedures, for the present their use is necessarily limited. The large outlay involved in the purchase of the expensive instrument required, and the special training needed by the staff in interpreting results, make it likely that in most laboratories the new chemical methods of great delicacy which are now available will be preferred. With the introduction of the Feigl "Tupfelreaktion" reagents, the microdetection and in many instances the quantitative estimation of many elements has been made possible. Only a fraction of the time and labour entailed in the older chemical manipulations is necessary with the spot-test procedures, and the sensitivity is many times greater. One of the best known and most useful of these is the *dithizone* method for detecting lead. This has

[1] Jour. Ind. Hyg., 1923, iv., 9.

[2] Bull. Johns Hopkins Hosp., 1935, lvi., 32.
[3] Jour. Ind. Hyg., 1933, xv., 157.
[4] Jour. Amer. Med. Assoc., 1935, civ., 90.

been applied to biological material by J. R. Ross and C. C. Lucas [5] and H. Bohnenkamp and W. Lineweh.[6] Their method takes advantage of the fact that a cherry-red colour is produced in the lower layer when a lead-containing fluid is shaken with a carbon-tetrachloride or chloroform solution of dithizone. By the use of this dye (diphenyl-thiocarbazone) as little as 0·1 γ of lead can be detected. Such sensitivity brings the chemical method into the range claimed for the spectrograph, and it is so much easier to apply that it is likely to gain, and for the present to retain, the favour of biochemists concerned with lead estimations.

OSTEOPATHY IN THE UNITED STATES

THE Osteopaths Bill which was read a second time in the House of Lords on Dec. 11th was referred, it may be remembered, to a Select Committee; the personnel of that body has already been announced in our columns and it is understood that it will commence session on Monday next. Two letters which are published this week in THE LANCET will be read with interest because they describe the professional situation of the osteopath in the United States, and that position was referred to by Lord ELIBANK in proposing the second reading of the Bill. But his description, in so far as it influenced the voting of the House, will be seen from these letters to have been unfortunate. He described the Osteopaths Bill as being designed to do what had been done already in other countries, and in exemplification told the House that since 1930 in all the States osteopathy was regulated and controlled by boards similar to those which the Osteopaths Bill proposed to set up. As a matter of fact the boards in the States are not common in form to all the States and non-existent in some. In certain of the most cultivated of them, with one exception, osteopaths have no representation whatever upon the boards; in another group of important States the board contains only one osteopathic member; and in a third group the osteopathic examiners function under outside supervision. There is no similarity here to the board which it is proposed to erect under the Osteopaths Bill, which, as set out in a schedule of the Bill, contains no representative of medicine and eight osteopaths. But it is not with the details of the Bill or indeed with the creed of the osteopath that we are concerned. The real menace to the country comes from the suggestion that an easy way should be made legal by which persons who are imperfectly trained in the principles and practice of scientific medicine should be regarded as fit ministers of the healing art.

We commend to close attention the letters from Prof. DAVID RIESMAN and Dr. FRANKLIN MARTIN. Prof. RIESMAN, one of the best known clinical physicians and teachers in the States, and professor of clinical medicine at the University of Pennsylvania, in a lucid description of the evolution of osteopathy shows that the medical profession in his country has always been opposed to the granting of privileges to osteopaths, holding it unfair to demand from the regular profession a long and arduous course of training while allowing the osteopath to come in through a back door to enjoy the rights of the regular profession. It is significant that he should write from Philadelphia, which is a prominent centre of osteopathy and the seat of one of the best educational institutions which osteopathy possesses. He is sympathetic to all progress, while critical of that assumption of learning which imposes on those who are willing to believe in the mysterious power of cults. And by as much as he shows that the osteopathy of to-day has progressed towards scientific medicine, by so much does he whittle away its claim to be regarded as a new system of medicine such as it was suggested to be by Lord ELIBANK. Dr. FRANKLIN MARTIN is the Director-General of the American College of Surgeons and his communication deserves similar close attention, so pertinent is it to the issues now about to be discussed by the Select Committee. He points to the lack of uniformity in the licensure acts of the various States, showing how entirely erroneous it is to consider that there exists throughout the country a uniform practice such as would make it logical to quote procedure in the States as a definite example to be followed. He makes it clear that the real leaders of scientific thought in the States do not in the least regard the practice of osteopathy as an alternative to the practice of scientific medicine, and this is strongly supported by two significant passages in his letter describing the attitude of the American College of Surgeons and the American Hospital Association towards osteopathy. The College has a minimum standard for hospitals on the basis of which it issues a certificate of approval to those complying, but gives no such approval to institutions which admit osteopaths to their staffs. The Association in its "essentials in a hospital approved for internes" lays down that the staff must be graduates of medicine from acceptable medical schools; thus expressing the feeling that anyone who attempts to practise medicine should have met the requirements of a full medical curriculum such as are demanded for regular doctors of medicine.

If the example of the United States is to be used to prove the value of osteopathy as an alternative system to that of regular medicine, the reasoning is weak. Countries which claim to be in the van of civilisation adopt the best of each other's procedures—those which by wide application have resulted in proven benefit; but imitation should stop there. The story of osteopathy in the States forms a warning and not an example, and the real leaders of thought in the States recognise this when the claims of osteopathy are put forward in rivalry with those of scientific medicine. As the United States is a huge country culture within its borders has varying standards at different centres. And because in some of those centres osteopathy enjoys for the present some position there is no ground for supposing that the public of this country would gain anything by following suit.

[5] Canad. Med. Assoc. Jour., 1933, xxix., 649.
[6] Deut. Arch. klin. Med., 1933, clxxv., 157.

ANNOTATIONS

PROGRESS IN MEDICAL RESEARCH

THE summary on another page of the progress made during the year in research subsidised in whole or in part by the Medical Research Council takes note only of the investigations selected by the Council for notice in the introductory pages of their report. No less important are the measurement and standardisation of biological substances; the development of research schemes in many branches of clinical medicine and of pathology; the efforts being made to solve problems of industrial disease; and the researches, still isolated, of individual workers which at any moment may supply the key to locked doors. Much of the work to which allusion is made has already been published or noticed in our columns; its significance is here assessed in relation to cognate work. The Council have also supplied preliminary notes on certain observations still incomplete, such as those on "accident proneness" among motor drivers, and on the incidence and spread of epidemics in certain residential schools. A statistical analysis of the data obtained from these schools in the first 11 terms is now being made by Prof. Major Greenwood and his staff. The authorities of a public school have allowed Prof. W. W. C. Topley to carry out nasopharyngeal swabbing on samples of 100 boys twice a term, with the result that valuable figures have been obtained for the carrier-rates of hæmolytic streptococci, pneumococci, and meningococci in a boy-population of school age.

A satisfactory feature of modern medical research, more manifest in each successive report issued by the Council, is the steady increase in the use of accurate statistical methods. It is clear that statistical advice should be sought by individual workers before they plan their investigations as well as in the assessment of their results. The disappointment arising when the possible significance of neglected variables is pointed out, or when deductions from figures which seemed adequate are disallowed, may thus be avoided, and such conclusions as may legitimately be drawn from the data available will be clearly defined. The extracts we give from the Medical Research Council's Report for 1933–34 show how much emphasis is laid on the complexity of the medical problems awaiting solution and how much care has been taken to avoid undue dogmatism in the interpretation of results.

X RAY DIAGNOSIS OF PLACENTA PRÆVIA

ANY method of assuring more certain detection and accurate location of the site of placental implantation would be welcome, provided it is harmless to the mother and fœtus. J. Friedman and D. O. MacDonald [1] have recently published an account of two cases in which certain diagnosis of the condition was established only after the placental shadow was seen on the X ray plate. Their work verifies that of Snow and Powell who showed last year, in a series of 60 cases, without any special technique, the position of the placenta in utero. Their findings were confirmed in a few cases at subsequent operations. There was no case of placenta prævia in their series, but Ude, Weum, and Urner published an account of three cases of placenta prævia diagnosed by the detection of the placental shadow in the lower uterine segment. Prior to these reports all recorded work in this direction had been based upon the injection of some substance opaque to X rays, such as strontium iodide, into the amniotic sac. When this was done the placenta appeared as a filling defect or a flattened area. Munro Kerr and MacKay reported adversely on this method, since in 3 out of their 10 cases the fœtus died following the injection. Intravenous injection of thorium, which substance is absorbed in the placenta, has as yet been found an unsafe technique for use in visualisation of the human placenta. In one of the cases screened by Friedman and MacDonald a faint semilunar opacity was distinctly seen in the true pelvis. Injection of 25 c.cm. of 5 per cent. sodium iodide into the bladder revealed a crescentic indentation which confirmed the diagnosis. The patient was admitted for Cæsarean section. However she discharged herself and went to another hospital where she was delivered by version of a dead fœtus, a central placenta prævia being found. In the second case a soft shadow was thought to represent a placenta prævia; 100 c.cm. of 5 per cent. sodium iodide was injected into the bladder, and the condition was then so clear that Cæsarean section was performed. The placenta prævia was found at the suspected site and a living child was born. The injection of the opaque substance into the bladder rather than into the uterus in such cases seems to be a distinct advance.

[1] Canad. Med. Assoc. Jour., January, 1935, p. 12.

SUPPURATIVE PAROTITIS

ALTHOUGH parotitis may develop in the course of any seriously weakening illness and is not very rare in acute infections such as pneumonia, its occurrence after operations is perhaps of greatest interest. When there is general sepsis, suppuration in the parotid is no more remarkable than many other local manifestations, and, when an operation has been done on the face or mouth, lymphatic spread or infection by contact is sufficient explanation for the complication. Actually, however, a majority of cases of post-operative parotitis follow an operation on the abdomen or pelvis, and—as has lately been pointed out by G. Arnulf [1] and by others before him—this may have been as simple as the removal of an "interval" appendix.

The ætiological problem can be considered under three heads: (1) the route by which infection reaches the gland; (2) the reason why the *parotid* salivary gland is particularly liable; and (3) the factors determining the onset of suppuration in a particular case. In the first place there seems to be a consensus of opinion that the organisms enter by the duct of Stensen. Arnulf and Herbert S. Talbot [2] agree on this point, and not long ago we reviewed [3] a paper in which Massabuau, Guibal, and Bert reached the same conclusion. The occurrence of parotitis apart from septicæmia; the presence in the gland of organisms predominant in the mouth; the fact that parotitis is produced more easily by injecting bacteria into the duct than by infecting the artery of supply; and finally, the presence of pus in the duct in the early stages of the disease—these provide the main arguments in favour of this view. Localisation to the parotid is explained by the demonstration that mucus inhibits bacterial growth, and the parotid, alone of salivary glands, secretes no mucus; but Arnulf mentions two other suggestions—namely, that an irregularity in the terminal

[1] Arnulf, G.: Rev. de chir., November, 1934, p. 680.
[2] Talbot, H. S.: Amer. Jour. Surg., 1934, n.s. xxvi., 267.
[3] THE LANCET, 1934, i., 910.

portion of Stensen's duct interferes with its drainage, and that a process of necrosis or autodigestion (like that seen sometimes in the pancreas) predisposes to suppuration. All these writers, however, are sure that the determining factor in post-operative infection is interference with the normal secretory function of the gland. Arnulf believes that inhibition of secretion is a reflex effect of operations which involve handling of the peritoneum and intestines. Dehydration may be another important element; hypersecretion during ether anæsthesia, vomiting during recovery, and shortage of fluid before and after operation, all contribute to it. Movements of mastication are apt to be at a standstill, and in cases where nothing is allowed to enter the mouth the normal taste stimulus to salivary secretion is lacking. Atropine and morphia both inhibit salivation. When one recalls that the mouth always contains organisms, this recital of the causes of interference with parotid secretion makes it seem surprising that parotid infection is not much commoner. But, as Arnulf points out, it requires a coincidence. The complete arrest of secretion is not of long duration, and the chance that, during such arrest, virulent organisms will be in contact with the orifice of the duct is not very great.

The methods of prevention are clear enough, and Talbot reports excellent results from a routine comprising careful attention to the hygiene of the mouth and attempts to maintain the free flow of saliva. Drugs which diminish salivary secretion were avoided, fluids were given as far as possible by mouth, and the patients had chewing-gum to encourage movements of mastication. When infection has occurred Arnulf and Talbot both prefer *late* incision of the gland at a time when fluctuation is obvious. This is contrary to the opinion of Massabuau and his associates, who strongly recommended early superficial incision, and opening up of the deep part of the gland with forceps.

EXPERIMENTAL MUMPS IN MONKEYS

MUMPS has been generally regarded as a virus disease, and the work of C. Nicolle and E. Conseil [1] and of M. H. Gordon [2] suggested that monkeys of the genus macacus were probably susceptible to infection. Last year C. D. Johnson and E. W. Goodpasture,[3] working in Nashville, Tennessee, reported that they had succeeded in producing a non-suppurative parotitis in rhesus monkeys by inoculating saliva from early cases directly up Stenson's duct into their parotid glands. Further, they were able to carry the virus through monkeys in series and to pass it through a Berkefeld filter. Neutralisation experiments with immune human sera were suggestive but not conclusive. The same workers [4] now report that virus which has been passed through eleven successive "generations" in rhesus monkeys during a period of fourteen months is capable of producing mumps in the human subject. Thirteen supposedly susceptible children and 4 immunes had their mouths sprayed with an emulsion of an infected monkey parotid gland. Six of the susceptibles developed mild but unmistakable mumps, 3 had doubtful symptoms, and 4 remained well. The 4 immunes all remained well. Mumps was otherwise absent from the community in which the experiment was carried out. The incubation period in the children varied between 18 and 33 days; in contrast to this the monkeys inoculated directly up the parotid duct showed an incubation period of only 3 to 6 days. The authors conclude, we think with justification, that the results of experimental work with the virus of mumps in monkeys may now reasonably be regarded as applicable to an explanation of pathogenesis and to the devising of means for prophylaxis against the disease in the human.

[1] Compt. rend. Soc. de Biol., 1913, lxxv., 217.
[2] Rep. Loc. Govt. Bd. Publ. Health, No. 96, 1914.
[3] Jour. Exp. Med., 1934, lix., 1.
[4] Amer. Jour. Hyg., 1935, xxi., 46.

INTERNATIONAL VITAMIN STANDARDS AND UNITS

THE decisions of the International Conference on Vitamin Standardisation were fully reported in our columns at the time of the Conference last summer.[1] The official report has now been published by the Permanent Commission on Biological Standardisation of the Health Organisation of the League of Nations in the current issue of the Quarterly Bulletin, 1934, iii., 428, and also separately (Extract 15). It is important that all who have any occasion to use or to refer to vitamin standards or units should inform themselves fully of the Conference's decisions, and should employ only the international standards and units adopted by the Conference. Their adoption has not, even now, come in time to prevent the incidence of a period of some five years in the literature of the vitamins, during which all manner of animal units of widely varying value and definition have been used, without reference to any standard substance at all, and the result has been chaotic. These various units have now been largely abandoned but some are, unfortunately, still in use. It is to be hoped that the international standards and units will soon be the only ones accepted in any country, and that all official pharmacopœias will adopt them as those in America and Great Britain are doing.

RADIOTHERAPY OF ACUTE INFLAMMATION

IN this country at any rate the treatment of almost all acute inflammatory processes, whether superficial or deep, is still mainly surgical. Everyone will agree, however, that the mere incision of an inflammatory focus and the evacuation of pus—preceded or followed by the liberal and often fortuitous application of the boracic fomentation—has its limitations. It is widely held, for example, that acute septic lesions about the lips and nose ought not to be incised without extreme caution, for fear of opening lymphatic or venous channels by which infection will reach the cavernous sinuses and brain or enter the general circulation. The dermatologist or radiologist may complain with some justice that in England he is seldom allowed to see large and active furuncles or cellulitis; these, like burns, erysipelas, and anthrax, are appropriated by the general surgeon. Yet in America the treatment of boils and carbuncles by X rays has long been practised, and papers by Hazen, Hodges, and MacKee have described it over a number of years. In France and Germany, too, it has not been neglected, and a general review of what has been accomplished has been contributed lately to a French journal by Dr. Miriam Liberson.[2] The painlessness of the remedy is an obvious asset, but it has also other advantages over surgery; thus it is said to shorten the period of involution and pain, and the cosmetic effect is excellent. No standard technique is suggested; every case must be considered on its merits. Experience goes to show, however, that the earlier a lesion is irradiated the greater the likelihood of aborting or shortening its usual evolution.

[1] THE LANCET, 1934, ii., 44.
[2] Rev. d'actinol. et de physiothérap., 1934, x., 185.

Heidenhain is quoted as recognising three groups of cases, of which the first comprises the pre-suppurative stages in which a cure or resolution without pus-formation, and after only one or two irradiations, may take place within a week or two. In the second group the treatment has been applied too late, the swelling will not subside without some suppuration, and this will usually necessitate a simple puncture and evacuation. The third group comprises the majority of the cases. Despite reduction of pain and fall in temperature there is a relatively rapid suppuration which demands careful surveillance, especially in view of the induced analgesia. Treated by X rays and evacuation such an abscess is said to heal promptly. W. Baensch has compiled a table comparing the results of severe facial furunculosis treated expectantly (also by Bier's suction, autohæmotherapy, and vaccines) and by X rays. There were 103 cases in each group, and they were chosen from the same clinic. In the irradiated group there were two deaths (1·9 per cent.), whereas in the other the death-rate was no less than 10·7 per cent. Most of the cases included in the radiological group had already received medical treatment of various kinds—a fact which tends to emphasise the value of the irradiation.

CARCINOMATOUS CHANGES IN A VIRUS-INDUCED PAPILLOMA

EARLY in January of this year [1] we gave a detailed account of recent experiments carried out by Peyton Rous and W. J. Beard with a papilloma of the rabbit which occurs endemically as a virus disease in the wild rabbit. R. E. Shope, who discovered this tumour, described it as an infectious papilloma and showed that it could be transmitted to the domestic rabbit by a cell-free extract. The work of Peyton Rous and Beard had as its main object the relationship of this epithelial tumour to the malignant tumours of mammals. They could show that in many, though not in all respects, there was a close resemblance between the two, and by methods designed to break down the resistance of the underlying tissue, such as bacterial infections, they even succeeded occasionally in inducing a malignant change in the Shope tumour. In a preliminary note published quite recently [2] Peyton Rous and Beard record the fact that this malignant change has now occurred spontaneously and without any further intervention in five out of ten rabbits in which the Shope tumour has continued to grow for periods of four to eight months. In one of these animals a metastasis was found in a lymph gland. In the spontaneous transformation of the papilloma to a carcinoma bacterial infection plays apparently the same important part as in the experimental transformation described in the previous paper.

In the interpretation of these findings the authors adopt a very cautious attitude. They draw an analogy between the malignant change induced by the Shope tumour and that induced by tar, and they point out that although tar induces a malignant new growth tar cannot be said to be the proximal cause of cancer. They do not forthwith assume that the cells of the virus-induced papilloma were malignant but speak of them as having malignant potentialities. Their conclusions are best given in their own words: "Even if the Shope virus gave rise forthwith to carcinoma the view would still be tenable that it had done no more than provide the conditions requisite to a cancerous change of unknown cause. At the moment this much only seems certain: The papilloma virus gives rise to skin growths which for some time are benign tumours, though their cells have malignant potentialities. Gradually, by alterations which involve no discontinuity of form or behaviour, the growths take on the character of typical carcinomas. Bacterial infection frequently acts to precipitate the change."

[1] THE LANCET, Jan. 5th, 1935, p. 32.
[2] Proc. Soc. Exp. Biol. and Med., 1935, xxxii., 578.

GROWTH FACTOR OF THE HYPOPHYSIS

CLINICAL and experimental evidence have together abundantly proved that control over bodily growth is exerted by the anterior lobe of the hypophysis. Pathological observations in established cases of acromegaly and gigantism have pointed to the alpha, or acidophil, cells as the source of the growth-promoting hormone. The truth of this theory is now demonstrated by some experimental work on the converse condition of dwarfism recently published from Copenhagen by T. Kemp.[1] He has used a strain of mice in which hereditary dwarfism appears as a Mendelian recessive and is accompanied by a congenital deficiency of alpha cells in the hypophysis. At the age of 6 weeks two of these mice began to receive daily subcutaneous injections of 0·4 c.mm. of growth hormone, obtained from the ox by the method of H. M. Evans and his co-workers. Two other dwarf mice of the same age were kept as paired controls. The first pair was killed 25 days and the second pair 39 days after the first injection. Graphs show a marked increase of body-weight in both experimental animals as compared with the controls. This increase was due to growth of the whole animal and not to retention of water or deposition of fat. The injected animals were stronger and their bones longer. The internal organs, including the endocrine glands, were similar to those of the controls with the exception of the thymus which was appreciably larger in the injected animals than in the controls. It is seldom that the conditions of a biological experiment can be planned so neatly as to provide a definite and conclusive result from the use of only four animals.

HOSPITAL ALMONERS

THE trained hospital almoner has long established and consolidated her position as far as voluntary hospitals are concerned. Her double function is now established: (1) to assess the contributions payable for maintenance after consideration of the patient's circumstances, and (2) to see that actual medical treatment is supplemented by such accessories as surgical appliances, extra nourishment, or country air which the patient may need and cannot obtain for himself without aid. The experiment of fitting a social service department of this kind into a municipal administrative scheme is, however, still in its infancy, the number of local authorities employing almoners being yet small. It is therefore a matter of moment that the largest public medical service in the country, the London County Council, has now decided to do so in all its general hospitals. In the annual report for 1934 of the Institute of Hospital Almoners emphasis is laid on the immediate need of a larger supply of suitable candidates for training, in view of the rapidly increasing demand, which now extends as far afield as Australia. A university degree means a shortened training, but candidates without academic qualification are accepted

[1] Klin. Woch., 1934, xiii., 1854.

on the understanding that they obtain one of the recognised social study diplomas or certificates in addition to 15 months' practical work. At the annual meeting of the Institute, held at the Westminster Palace Rooms on Feb. 21st, over which Dr. A. B. Howitt presided, Sir Walter Langdon-Brown traced the development of almoners' work since its beginnings at the Royal Free Hospital in 1895. He spoke of the need in hospitals for trained social workers who are in close touch with the home conditions of the patients, since a knowledge of such conditions is often essential in determining appropriate treatment. Few people who have not actually worked in an almoner's office realise how varied is her scope. In a little book prepared by a committee of the Hospital Almoners' Association [1] her duties at different special hospitals—chest, venereal disease, maternity, ophthalmic, orthopædic, and psychiatric—are set out in detail, and the ideals governing the selection and training of applicants are fully discussed. Parents and teachers considering careers for girls will find this book interesting, and all concerned with hospital organisation will learn something from its pages.

"ACCREDITED" MILK

THE Milk Marketing Board's scheme for accredited milk was due to come into operation on Jan. 1st, but has so far remained in abeyance, largely because of opposition from the County Councils Association. It is now reported that the Board and the Association have reached an understanding, and that a beginning will be made on May 1st. The scheme provides for a roll of accredited producers who will receive a bonus payment from the Board, the chief condition of admission being that the producer should have his herd "clinically" examined once in six months by an approved veterinary surgeon, and remove all animals considered a danger to the milk supply. Also the methods of production and handling must be satisfactory to the county agricultural organiser, and the county bacteriologist must examine three samples annually and refuse to pass them unless the bacterial count is below 200,000 per c.cm., and *Bacillus coli* is absent in 0·01 c.cm. Obviously this plan involves no little expense to the authorities (for the most part the county councils) whose officers undertake these duties, and though its benefits are mainly reaped by the large towns, which make no contribution to the cost, they are expected to meet it without financial assistance from the Exchequer. A number of difficulties in administration may also arise, and it should be understood that the reported agreement does not in any way bind the individual county councils, which may or may not fall into line.

The most influential and comprehensive report on the problems of a pure milk supply is that of the Cattle Diseases Committee, and this report is definitely not in favour of a scheme on the above lines. Most authorities, and almost all experts, favour the proposals of the committee, and are hoping for legislation in accordance with its findings. Failing this, how far will the milk from accredited producers be the kind of milk acceptable to the medical profession? In effect it is Grade A milk over again under a new label and with slightly less stringent conditions. But it is fairly generally accepted that the Grade A criteria fail to give a safe milk, and most experts agree with the Cattle Diseases Committee in their wish to abolish this grade. Too many samples of Grade A milk contain tubercle bacilli. "Accredited" milk should be clean milk, but it will not be *safe* as regards either tuberculosis or other infectious diseases, and it cannot be accepted as suitable for school-children. The position, already difficult from the point of view of the public, is further complicated by the "attested" herd scheme of the Ministry of Agriculture which came into operation on Feb. 1st last. This is milk from herds proved free from tuberculosis, or the risk of conveying tubercle bacilli to man, by the only test of value for that purpose—i.e., by regular testing with tuberculin. Such herds will supply milk which is free from this risk, and in this respect the scheme is to be strongly commended; but unfortunately the inducements offered to producers are hardly great enough to persuade many of them to clean their herds, and the practical results are unlikely to be great unless the Ministry of Agriculture can be brought to make the proposals more attractive.

The whole milk problem is becoming more and more confusing to the public with the designated milks of the Ministry of Health—i.e., Certified, Grade A (tuberculin tested), Grade A, and Pasteurised—the milk from "attested" herds of the Ministry of Agriculture, and now the "accredited" milk of the Milk Marketing Board. In this welter of nomenclature the only sound policy for the medical profession is to reiterate their demand for a clean, safe milk-supply, and for nothing else. How to obtain such a supply is indicated in the report of the Cattle Diseases Committee, and we hope that effect to its recommendations will not long be delayed. The "accredited" milk scheme, though it will doubtless do something to raise the general standards, is a half-measure which may easily postpone what is ultimately necessary—a safe milk-supply.

LORD SOMERLEYTON

THE medical profession has lost in Lord Somerleyton, who died in London on Monday last after a short illness, a true friend. If it can be said of one layman more than another that he was the most practical advocate whom the voluntary hospitals of the country ever had, it can be said of him who will be best remembered as Savile Crossley. He was honorary secretary from its foundation to his death of King Edward's Hospital Fund for London, and for many years also chairman of the Hospital Saturday Fund. His work on behalf of King Edward's Fund was remarkable for its energy and administrative ability; it would be indeed difficult to estimate how far the continued prosperity of the Fund can be directly attributable to Lord Somerleyton's devotion.

ON March 7th, 12th, and 14th Dr. Alan Moncrieff will deliver the Goulstonian lectures to the Royal College of Physicians of London. He will speak on respiratory failure, including so-called asphyxia neonatorum. The lectures are open to all members of the medical profession, and will take place at the College at 5 P.M.

BY a proclamation issued at Buckingham Palace on Feb. 21st H.M. the King has directed that Monday, May 6th, being the twenty-fifth anniversary of his accession to the throne, shall be observed as a bank holiday and as a public holiday throughout the United Kingdom. The day is already a bank holiday in Scotland.

[1] The Hospital Almoner. London: George Allen and Unwin, Ltd. 1935. Pp. 168. 5s.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XLII.—THE PROGNOSIS IN CARBUNCLE

THE following remarks are based on the study of the 240 cases of severe carbuncle admitted to St. Thomas's Hospital in the five years 1928–33. Of these, 170 were in males and 70 in females, bearing out the common belief that carbuncles are commoner in men. The case-mortality rate was 5·8 per cent. with no difference between the sexes in this respect. The area incidence of the lesion is shown in Table I.

TABLE I.—*Area Incidence of Carbuncle (Severe) in 240 Cases*

	Neck.	Face.	Trunk.	Limbs.
Male ..	87 (51·2%)	44 (25·9%)	25 (14·7%)	14 (8·2%)
Female ..	14 (20%)	39 (55·7%)	12 (17·2%)	5 (7·1%)

These figures apply only to severe carbuncles; the proportion of facial cases would be lower and that for the limbs proportionally higher if cases of moderate and mild severity had also been included. The case-mortality in this series was about equal in all but facial carbuncles, where, as will be seen later, the prognosis is poor and the case-mortality about twice as high as in other situations.

The total case-mortality in this series, as has been said, was 5·8 per cent. (13 deaths). It is fair to assume that for every case of carbuncle admitted as an in-patient two are treated in the out-patient department. On this assumption the prognosis as regards life in cases of carbuncle must be considered distinctly good. Even for this series of severe cases, if we exclude the diabetics (10) and the facial carbuncles (83), the case-mortality among the remaining 147 cases was only 3 (2 per cent.). This does not include cases where death occurred subsequently from chronic pyæmia, which supervenes in about 1 per cent. of carbuncles. In my experience chronic pyæmia arising from this cause (from a cerebral abscess) has only once terminated fatally, though the pyæmic abscesses may appear at intervals as long as 10–15 years after the original infection. Such chronic pyæmic abscesses seldom need more than aspiration, and in due course they cease to appear.

Acute pyæmia or septicæmia was the cause of death in no less than 11 of the 13 fatal cases and are clearly of serious prognostic significance. They are undoubtedly more liable to occur if surgical interference is undertaken when the carbuncle is spreading or still unlocalised; in 8 of the fatal cases in this series death can be attributed to this error in treatment. Acute pyæmia or septicæmia also tends to occur in facial carbuncles, especially those near the nose or eye, when a further complication is to be looked for in cavernous sinus thrombosis, always a very grave sign.

Effect of treatment.—Generally speaking, this investigation suggests that the more drastic the treatment the less the fatality. Table II. shows the number of deaths which followed treatment by conservative measures, by incision, and by excision. Conservative treatment as practised at St. Thomas's includes not only the application of glycerin and magnesium sulphate paste, but the injection of whole blood, and in some cases the application of ultra-high-frequency current.

TABLE II.—*Effect of Treatment*

Treatment.	Non-diabetics.		Case-mortality.	Diabetics.	
	Cases.	Deaths.		Cases.	Deaths.
Conservative ..	114	6	5·2%	1	0
Incision ..	40	2	5·0%	4	3
Excision ..	86	1	1·1%	5	1

It would appear that, where surgery is carried out, total excision of the gangrenous area is a better and safer procedure than incision of the skin "to relieve tension." This applies to cases uncomplicated by diabetes and where the lesion is not situated on the face. These two groups of cases must be considered separately; either calls for the admission of the patient to a hospital or nursing-home, and for a guarded prognosis.

Carbuncle in diabetics occurs almost always on the back, abdomen, buttocks, or thighs; in this series none occurred on the face. True diabetes was a complicating factor in only 10 of the 240, but of these 4 died. It is important to distinguish between true diabetes and the toxic glycosuria (and albuminuria) often present in cases of severe carbuncle; these symptoms have no prognostic significance, except to show that general toxæmia is present, and they disappear after excision of the carbuncle, which should, in my opinion, be undertaken promptly. In the presence of true diabetes no surgical procedure should ever be undertaken for carbuncle.

Facial carbuncle was present in 83 of the cases in the series. This very high proportion is no doubt due to the fact that as these patients are usually ill, and the prognosis is known to be poor, all cases were admitted to hospital. Of the 83 cases 7 died, giving a case-mortality rate of 8·4 per cent., considerably higher than that for all the severe carbuncles of this series taken together. Conservative treatment is the routine for these cases and was employed in all of them, but in 10 cases an incision was made for the relief of tension. In the 73 cases where no surgery was used 5 deaths occurred; whereas of the 10 cases (possibly more severe) in which an incision was made 2 died. It would seem that while the prognosis in facial carbuncles is anyway much graver than in those met with elsewhere, conservative treatment alone should be used since even the slightest surgical interference greatly increases the risk of a fatal issue.

SUMMARY AND CONCLUSIONS

Carbuncle, unless occurring as a complication of diabetes mellitus or on the face, is not so serious a condition as is generally supposed; among the 147 cases left in this series when the 14 diabetics and the 83 facial cases have been excluded, there were only 3 deaths (2 per cent.). If, as seems likely from investigation of figures over a shorter period, the total number of cases of carbuncle seen and treated in hospital over the same period was about three times the number admitted to the ward, the case-mortality rate would be about 1 per cent. or less. The occurrence of acute septicæmia and pyæmia are of very grave import, but their effect can be greatly minimised if the surgeon takes no active steps to intervene locally till the carbuncle has ceased to spread. Lastly, whereas in localised carbuncles excision is the safest form of treatment if surgery is decided on, *no* surgical treatment should be attempted under any conditions either in facial carbuncles or those complicating diabetes.

I wish to thank Mr. R. J. Battle, late house surgeon in the septic wards at St. Thomas's Hospital, for assistance in the collection of these statistics.

PHILIP H. MITCHINER, M.D., M.S., F.R.C.S.,
Surgeon in charge of Septic Wards and Surgeon to Out-patients, St. Thomas's Hospital.

SPECIAL ARTICLES

MEDICAL RESEARCH COUNCIL

REPORT FOR THE YEAR 1933–34

In the introduction to this report it is announced that the means for giving effect to the project for a suitable memorial to the late Sir Walter Fletcher, the first secretary to the Council, is now assured. A portrait bust will be commissioned, designed for the National Institute for Medical Research at Hampstead, and the remainder of the sum collected will be used as the nucleus of a fund for building at Mill Hill a laboratory to be devoted particularly to nutritional studies.

Under appropriate headings are summarised, in this introduction, some of the more important investigations in progress by workers receiving grants from the Council.

Clinical Research

During the year the Council have made further efforts to improve the facilities available in this country for the scientific study of disease in the human subject, and to increase the inducements towards clinical research as a career. Clinical research units under whole-time directors are now supported by the Council at the National Hospital and at Guy's Hospital, the unit formerly subsidised at University College Hospital having been permanently endowed by the Rockefeller Foundation. The Council note with satisfaction that their own endeavours to provide opportunity for clinical research form part of a general tendency which is receiving increasing recognition throughout the country, and they record the establishment of several new whole-time appointments for teaching and research in medicine and surgery during the year under review.

Research into Mental Disorders

A new committee has been appointed, in consultation with the Board of Control, to advise and assist in the promotion of research into mental disorders. It includes representatives not only of psychiatry, medical psychology, and the study of mental deficiency, but also of neurology, physiology, biochemistry, pathology, and genetics.

One of the questions dealt with concerns the possible deleterious effect on development of vasectomy if it is performed before the attainment of maturity. The Council have been able to advise that sufficient evidence exists to show that no such effect results from vasectomy in young animals. Apart from that, the recommendations for research all have regard to the wider problems of the causation of mental disorder and deficiency, including the part played by hereditary transmission. A valuable line of research lies in the examination of the offspring of consanguineous marriages, in comparison with those of other marriages, in respect of the incidence among them of mental defect and disorder. The committee recommend inquiry into cases of mental defect in pairs of similar and dissimilar twins, as affording a means of testing the relative importance of genetic and environmental factors. A plea is also made for the wider study of the nature of defective inheritance, including the relation of mental deficiency to other degrees or kinds of mental abnormality, and for fundamental biological research into the nature and causes of those germinal mutations which originate transmissible abnormalities.

These inquiries are intended to supplement and not to supplant the direct study of mental disorder, whether it be by the purely psychological examination of the mental states themselves, or by the pathological investigation of the underlying physical conditions.

Inheritance and Disease

It is of course obvious that the question of the part played by inheritance in the causation of disease has importance for a much wider field of medicine than that of mental disorder alone. Two practical difficulties have stood in the way of the fuller investigation of inheritance in man. In the first place, the method of experiment—with its deliberate matings of individuals showing the characters under study—is clearly inapplicable. In the second place, observational methods are handicapped by the small size of human families and by the length of the interval between generations. There remain certain statistical methods of approaching the problem which require the collection of very large masses of data of a kind not always easy to obtain.

A human genetics committee, under the chairmanship of Prof. J. B. S. Haldane, have now initiated some new investigations—intensive and extensive.

Under the first head are genealogical inquiries into the occurrence of a particular congenital defect in different members of a family, through as many generations as may be possible. Examples of these are those that Dr. Julia Bell has already been making for many years in respect of diseases and abnormalities of the eye. Various other physical defects suitable for genetic investigation are under consideration. It is noteworthy that for this purpose relatively trivial but well-marked peculiarities are at least as useful as grave defects, rare abnormalities having the advantage that their multiple occurrence in any particular genealogy is unlikely to be due to chance.

A scheme has been devised for the extensive collection of statistical data on the question of consanguinity. It is proposed to examine the incidence of consanguineous parentage among large groups of cases of particular diseases or defects. In order to find out the incidence of consanguineous parentage among the general population, which is not ascertainable from marriage registers, or official vital statistics, a large number of hospitals throughout the country have been asked to record this question of parentage in respect of all their in-patients during a certain period. The record will be made without discrimination as to diagnosis, to avoid the risk of statistical fallacies. It is hoped to discover (1) the proportion of individuals in the general population who are the offspring of marriages between blood relations; (2) what morbid conditions occur more commonly among such individuals than among other people. The aim in view is the detection of "recessive" defects. Up to the present time the study of genetics in man has enabled many more dominant than recessive inherited defects to be identified, and it is considered likely that many such defects await detection.

Another important question of inheritance has to do with the part which it plays in the production of immunity to disease infection. This is difficult to study in man by reason of the number and variety of the other factors of which the effect cannot be measured. Even in experimental investigation of the hereditary factors concerned with the production of immunity in communities of animals kept in a relatively stable environment great care is necessary in controlling the conditions of experiment, and in assessing results. Mr. A. Bradford Hill, D.Sc., has reviewed the experimental data contained in the published literature dealing with this question, and has defined the criteria that are applicable to its interpretation in a report published during the year.

The Natural History of Epidemics

Congenital immunity is only one of many factors which affect the incidence of infectious disease and

determine the form of its epidemic spread. Apart from the characteristics of the particular infection and the mode of its transmission, the epidemiological picture depends upon a number of variable conditions in the population exposed to risk. These include the size and density of the community, the degree of segregation into groups, and the rate at which new entrants are being received. The ratio between immune and susceptible individuals at each stage of the epidemic, both in the main herd and in any immigrant stream, is likewise a determining factor, as is also the extent to which immune individuals are carriers of infection.

Knowledge of the natural laws governing epidemics in human populations has been greatly advanced by the experimental researches made on mice during the last few years by Prof. W. W. C. Topley and Prof. M. Greenwood. The study has more recently been extended in a practical direction to the investigation of infectious illnesses in the more or less closed communities presented by boarding-schools. The scheme is aimed chiefly at those diseases which spread by droplet infection. The main programme of recording in the different public and other schools coöperating has now been completed, but much work on the analysis of the data still lies ahead; and further collection of data is to be made in order to clear up questions that have arisen in the course of the observations.

The Council have recently published a report by Surgeon-Captain S. F. Dudley, Surgeon-Captain P. M. May, and Surgeon-Commander J. A. O'Flynn on diphtheria among the pupils of Greenwich Hospital School before and after the acceptance by the school authorities of inoculation against diphtheria in 1928. This has made possible a close comparison of natural immunity, acquired by a community in which diphtheria was endemic, with a condition of immunity artificially induced by inoculation.

The main conclusions reached have already been set out in our columns. It is worth emphasising one of them; that while artificial immunisation is an almost certain protection against the occurrence of recognisable clinical diphtheria, active immunisation by inoculation is no protection against diphtheria carrier infection, and may under some conditions increase the number of virulent carriers; this shows the limitations of this method of protection against diphtheria when it is only partially carried out in a community, as an increased number of carriers among the immunised might perhaps lead to an increased number of cases of diphtheria among the remainder. It is also demonstrated that the state of immunity resulting from Schick inoculation is not a permanent condition, but one tending to wane in efficacy unless strengthened from time to time by repeated stimulation, whether artificial or through exposure to natural infection.

The difficulties and sources of possible fallacy in the study of human epidemiology are illustrated also in a report by Dr. C. M. Smith. The object of the inquiry was to ascertain the amount, nature, and incidence of the sickness occurring during one year among a population of approximately two thousand people in a poor district of Glasgow; acute respiratory disorders accounted for almost half the total morbidity, while tuberculosis, acute infectious diseases, and chronic respiratory disorders came next in order of importance.

Half the population under study was housed in a poor-class district of the slum type, and the other half in a rehousing scheme area. Comparison of the morbidity in the two groups yielded no conclusive results as to the influence of the respective environments. The value of the inquiry from this point of view, indeed, lay rather in the attention drawn to the difficulty of reaching reliable conclusions on the important question of the relation of housing to health. In this inquiry, for instance, there was found to be a possible source of error in a substantial difference in the racial compositions of the two populations. The inhabitants of the rehousing area, moreover, were adjudged better at reporting their illnesses, and may thus have tended to show a greater morbidity. Furthermore, a part of the rehoused population, who had not been long in their new homes, retained the slum habit of crowding into one room at night, especially in winter. As regards sleeping accommodation, therefore, they showed serious overcrowding, although on the conventional basis of persons per available room there was only a fifth of the amount of overcrowding found in the slum. This led the investigator to suggest that the standard of sleeping arrangements, rather than the cubic capacity of the whole dwelling, is the measure of environmental conditions which has practical importance in relation to the spread of respiratory infections.

Tuberculosis among African Natives

Three reports received by the Council on the subject of tuberculosis among the natives of different parts of tropical Africa have lately been published. This disease was formerly very rare amongst the African races but is now becoming widely diffused; it sometimes spreads with great rapidity in native populations not previously exposed to infection.

In Zanzibar the survey by Dr. R. J. Matthews dealt with a comparatively restricted area and with a long-established community of very mixed racial composition. In Tanganyika the investigation by Dr. C. Wilcocks was concerned with the inhabitants of an inland area of a vast and thinly populated territory, which had come under influences of civilisation only in recent times. In the Southern Sudan the subject of study by Captain S. M. Burrows was one of the most elusive and isolated of African tribes, the Eastern Dinkas, who had been almost entirely free from outside contacts until the present century.

These reports provide the basis for useful comparisons between populations exhibiting different stages in the invasion of a community by tuberculosis. All are affected, but the extent to which infection is present varies directly with the opportunities for outside contact and inversely with tribal isolation. Among newly infected peoples tuberculosis tends to take a form in adults which is more familiar in children among Europeans; although there is little resistance to infection the disease remains of a mild type under natural conditions, but repeated reinfection, unfamiliar modes of life, and industrial stress lead easily to acute and severe illness. On the other hand, in settled communities where tuberculosis has long been endemic the disease tends to take a chronic form among adults, and the cases often well withstand industrial stress under stable and prosperous conditions of life.

Influenza

The transmission of influenza from human cases to mice as well as to ferrets (see THE LANCET, 1933, ii., 66, and 1934, ii., 859) extends the possibilities of experiment and will be of great practical help in the work. The method of transmission (intranasal inoculation under light ether anæsthesia) is of crucial importance, and there is no evidence of natural spread of the disease from infected mice to others living in contact with them. Cultural and filtration experiments have confirmed that the mouse disease is due to an ultramicroscopic organism. The work does not give any immediate prospect of practical applications to the control of human influenza, but a much clearer understanding of the disease may be confidently expected and, in particular, it is likely to facilitate the distinction between true epidemic influenza and the many other conditions to which the name is at present loosely applied.

Chemical Problems of Bacteriology

The different types of requirement exhibited by bacterial species may be regarded as successive levels in an evolutionary scale. At the bottom are those forms which make relatively simple demands and can thus satisfy them throughout a wide range of environmental conditions. The higher forms are those which have adapted themselves to the use of more complex food substances, but have at the same time lost some powers of synthesising compounds from simple sources; in becoming more exacting in their demands they have also become more dependent upon a specialised environment. Along such lines as these the emergence of parasitism may be pictured as occurring. The Council have aided research into the chemical problems of bacteriology by Prof. F. W. Twort, Prof. J. W. McLeod, Miss Marjorie Stephenson, Dr. P. Fildes and Mr. B. C. J. G. Knight, and Mr. H. W. Dudley, Ph.D., Mr. P. Bruce White, and Mr. G. Gough, Ph.D. This year a special department for research in the subject, situated at the Middlesex Hospital, has been placed under the direction of Dr. Fildes, and Prof. J. R. Marrack has published a review of the more important results of recent experimental work upon the chemistry of antigens and antibodies, considered in the light of present-day knowledge of molecular structure.

Chemical Control of the Nervous System

The investigations bearing on the part played by specific chemical agents in the control of the nervous system are of two kinds. The result of work by Sir Henry Dale and his colleagues make it highly probable that the effectiveness of practically all messages passing from the central nervous system to voluntary muscles and other organs of the body depends upon the liberation—at particular points in their course—of a very active but also highly unstable chemical substance known as acetylcholine. The possibility that the activity of the nervous system depends primarily on a series of "drugs" produced in the body itself completely transforms the outlook on the intrinsic mechanism of the nervous system.

The second type of evidence showing the importance of specific chemical substances in the working of the nervous system has been brought to light by nutritional experiments. Prof. R. A. Peters and his colleagues at Oxford have shown that when vitamin B_1 is deficient in the body, parts of the brain become incapable of oxidising carbohydrate completely, with the result that lactic acid accumulates and dire results follow, involving the collapse and early death characteristic of lack of this vitamin.

Other nutritional investigations have shown that in young animals vitamin A or carotene is essential for the maintenance of the proper structure and function of the nervous system. In its absence from the body, widespread degenerative changes take place in some of the nerve-cells and their conducting fibres. The effect of vitamin A is largely on the afferent side of the nervous system: it is those fibres and nerve-cells which conduct impulses into the spinal cord, and to the brain, that are specially put out of action by deficiency of this factor.

Sex Hormones

From out of a growing wealth of detail about the sex hormones there is beginning to emerge more clearly a picture of a closely linked system of stimuli and responses involving several different organs. Primary control seems to lie with the anterior lobe of the pituitary body. This is now known to produce, and to discharge into the circulating blood, two or three distinct substances having physiological activity in relation to the reproductive system. These hormones stimulate in different ways the actual sex glands, the ovaries and testes, which in their turn—in addition to fulfilling their direct function—liberate substances affecting the body more generally.

The advance in understanding of the physiological actions of sex hormones has been accompanied by a growth in knowledge of their chemical nature. Some of the sex hormones, with various other substances produced in the body, are found to be members of a series of compounds having much in common in their chemical structure, and making a strong suggestion that one may be formed from the other.

Work by Prof. J. W. Cook, D.Sc., and Prof. E. C. Dodds has shown that certain compounds which are potent agents in the production of experimental tumours are closely allied in chemical constitution to the group of physiological substances just mentioned. Synthetic compounds of this type have indeed been prepared which possess the power both of inducing tumour growth and of exciting the œstrous state. This finding is the more suggestive in that, on the biological side, some resemblance may perhaps be traced between the cell multiplication due to the œstrogenic hormone and the early stages of malignant growth.

Accident Proneness and Road Dangers

An investigation is now being undertaken by Mr. E. Farmer, Mr. E. G. Chambers, and Mr. F. J. Kirk, of the Industrial Health Research Board, on motor accidents.

From a statistical examination of the road accident records of four groups of 'bus and private drivers, totalling 2604 persons, it has been shown that in each group certain individuals are more liable to accidents than others. This holds true for all accidents, including those for which the driver was not held to blame. From a more intensive examination of a group of 179 motor drivers from among the foregoing, it is found that those who sustain an undue number of one kind of road accident tend to sustain an undue number of other kinds of road accident; that those who sustain an undue number of accidents in one period tend to do so in subsequent periods; and that the elimination (on paper) of those who sustain an undue number of accidents in an initial period of exposure reduces the accident-rate shown by the remainder of the group in the subsequent period. The preliminary results obtained from the study of motor accidents are thus similar, so far as they go, to those previously obtained with reference to factory accidents.

As regards practical application, there are two ways of preventing the accident prone from engaging in specially dangerous occupations. First, by appropriate tests that will determine beforehand who are most likely to sustain accidents; secondly, by removing those who in an initial period of exposure sustain an undue number of accidents. The first method has not yet been brought to a stage of practical utility. The second method rests upon a surer foundation, and there can be little doubt that if drivers who sustain an undue number of accidents in an initial period of exposure are removed from subsequent exposure, the accident-rate of the group will be significantly lowered. To obtain sufficient data, however, it is necessary to take into account all minor accidents and not merely those which result in legal proceedings. The records of insurance companies presumably contain all the material necessary for preparing tables which would give the average accident-rate of different classes of drivers, and would indicate to what extent this must be exceeded

by a driver before he can be regarded as specially accident prone.

The novelty of the method, as compared with judicial disqualification in isolated cases as at present, lies in the facts that it makes use of information provided by minor accidents, and that it is dissociated from any question of blame. The Council believe that a successful attack upon problems of road dangers will necessarily have to take into account, in one way or another, the existence of the phenomena of accident proneness which are being brought to light.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE HEALTH OF THE NATION

UNDER the title of "Your Welfare" a broadcast talk was given from Dublin last week by Mr. Sean T. O'Kelly, Minister for Local Governments Public Health. He appealed to his listeners to do their share in building up a healthy nation in Ireland. There were colossal misfortunes due to avoidable diseases and needless deaths. Although it had been the case since 1925 that no county area should be without a county medical officer of health, there were still eight counties, comprising about one-quarter of the country population, in which these appointments had not been made. Yet when the recoupments from State grants had been completed for 1933 the net cost of the medical officer of health system only slightly exceeded a halfpenny in the pound on the valuation of the counties concerned. Pressure from headquarters was now insisting that these appointments should be made. He complained that his department received very little support from public opinion in the efforts it had been making. The death-rate in the Irish Free State area had been reduced in the past 50 years from 18 to 14 per 1000 mainly by enlightened sanitary reform. That meant that the annual death roll had been diminished by some 12,000 persons. In ten years the death-rate from typhoid had decreased from 4·1 to 2·5 per 100,000 persons living. There had been no death from small-pox since 1907, and there were only three deaths from typhus last year. In common with other countries Ireland had to deal with a high incidence of diphtheria. The beneficial effects of school medical inspection, housing, milk, and sanitation schemes would ensure that the young people growing up would be stronger, and a fall in the incidence of disease and in the death-rate would follow.

HOSPITAL ORGANISATION

Mr. Seton Pringle, president of the Royal College of Surgeons in Ireland, speaking at the Charter Day dinner of the College on Feb. 16th, commented on the need of a thorough survey of the system of public hospitals throughout the country, their relations to each other, and their relations to the voluntary hospitals in the cities. In each county there was one county hospital and usually one or more district hospitals. The district hospital was primarily for the treatment of ordinary medical and minor surgical cases, whereas the county hospital was essentially the surgical hospital for the county. The district hospital was staffed by one or more general practitioners, while the county hospital was under the charge of a surgeon with operating experience. He had in some cases the assistance of a house surgeon and of a physician who often acted as anæsthetist. The county surgeon had power to send to a city hospital at the expense of the ratepayers a patient whose case could not be adequately treated in the county hospital. In theory the system appeared admirable—a chain from the district hospital through the county hospital to the city hospital, but he had criticisms to offer. As regards the district hospitals there should have been a careful survey of each county with regard to the distribution of the population and the health of the district, and a definite policy adopted in determining the number of hospitals required and the sites and sizes of each. No such survey had been made and no such policy adopted. For example, in the county of Cork, a large county certainly, they had in use or in process of erection no less than 17 hospitals, apart from the city hospitals. This represented a proportion of one hospital to each 17,000 of the population, whereas in Meath there were only two hospitals for a population of 60,000, and in Sligo one for over 70,000. In another county there had been for some years two district hospitals of 15 and 20 beds respectively, the average number of beds occupied in each being about 50 per cent. These hospitals were being replaced by two new hospitals, each to accommodate 30 beds. As regards the county hospitals the county boards of health would not realise that medical work had reached a stage where group work was essential. The surgeon might require not only the help of a physician or gynæcologist, but of a radiologist, a pathologist, an ophthalmologist, or a biochemist, if a correct diagnosis were to be made and a right line of treatment adopted. The boards of health expected the county surgeon to be able to deal with everything almost single-handed, and they considered it a confession of incompetence if he recommended the transfer of a patient to a city hospital. In 16 county hospitals there was no house surgeon, and in nine the surgeon had no assistance other than that of a part-time anæsthetist. Mr. Pringle pleaded for closer coöperation between the county hospitals and the city hospitals, so that transfer of patients might easily be made, and so that the county surgeon and the surgeon to the city hospital might regard each other as colleagues.

COMPLIMENT TO SIR JOHN MOORE

On Feb. 21st the Royal Academy of Medicine in Ireland entertained a large company in the hall of the Royal College of Physicians of Ireland to witness the admission as an honorary fellow of the Academy of Sir John William Moore. In presenting Sir John to the president, Dr. T. P. C. Kirkpatrick, general secretary of the Academy, stated that he had received his medical degrees from Dublin University in 1868, and had been elected a fellow of the Royal College of Physicians of Ireland in 1873. He had represented the College on the General Medical Council for 30 years, and had been physician to the Meath Hospital for 58 years. He had been editor of the *Dublin* (now *Irish*) *Journal of Medical Science* for 47 years. He was one of the first on whom the diploma in State medicine had been conferred by the University of Dublin when the diploma was established in 1871. He was one of the original fellows of the Royal Academy of Medicine in Ireland which was founded in 1883. Sir John is now in his ninetieth year and is in vigour of mind and body. The Academy presented him with a portrait painted by Mr. Sean Sullivan, R.H.A.

THE NEED FOR ORTHOPÆDIC TREATMENT IN IRELAND

At the annual meeting of the Orthopædic Hospital of Ireland held on Feb. 20th, Mr. Seton Pringle

urged that there should be a national scheme to prevent crippledom. The public was still apathetic, but they should know that about 80 per cent. of the cripple population might never have been crippled had proper treatment been given in childhood. The vast majority of deformities was due to three diseases —tuberculosis, rickets, and infantile paralysis— diseases which were largely preventable by improving the conditions in which the poorer classes lived. Efficient treatment given in the early stages could cure these diseases in most cases, and could, at any rate, prevent their causing crippling deformities. A great increase was necessary in the number of special hospitals, or in the number of beds in the existing hospitals. Again, after discharge from hospital prolonged supervision was necessary, and for that purpose after-care centres or clinics under the charge of specially trained doctors and nurses would be required throughout the country.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

ROYAL MEDICAL SOCIETY

THE annual dinner of the presidents of the Royal Medical Society which was held last week is perhaps the most interesting of the many medical dinners held in Edinburgh about this time of year. There were about 130 guests present and the senior president of the year, Dr. J. L. Henderson, presided. Emeritus Prof. Edwin Bramwell, who was the guest of the evening, in proposing the toast of the Royal Medical Society, reminded the company that the society celebrates its 200th anniversary in two years time. In suggesting that all medical students should join the society, Prof. Bramwell advised them to learn to emancipate the mind from the fetters of authority and prejudice. They should also cultivate the faculties of independent thought, of criticism, and of scientific curiosity. These were some of the lessons the society taught, and it had played a great part in moulding the future of some of the masters of medicine who had made the name of Edinburgh world-famous. It offered a corrective to the spoon-feeding which was one of the curses of present-day education.

CLINICAL TEACHING OF MIDWIFERY

Medical students at Edinburgh University are now obliged to spend five weeks in residence in a hostel near the maternity hospital. During this period they are expected to be present at the treatment of the abnormal cases admitted to the hospital. This experience is additional to the training they receive in the management of normal labour. The hostel was opened in September, 1933, and at a meeting of the university court last week it was reported that during the first 12 months 195 students passed through the hostel.

TUBERCULOSIS IN THE SOUTH-EAST OF SCOTLAND

The twelfth annual report of the East Fortune Sanatorium was submitted by the medical superintendent, Dr. Cameron, last week. The institution, which provides treatment for patients from the south-eastern counties of Scotland, admitted 214 patients during the past year, and of these 51·4 per cent. suffered from tuberculosis of the lungs. Forty-one patients have been in the sanatorium for over two years, and 13 for over four years. Dr. Cameron deplored the fact that in 71 per cent. of the lung cases the disease was already at an advanced stage when the patients were admitted. He emphasised the value of X rays in the early diagnosis, but said that the use of X rays in advanced cases was a waste of public money. The number of patients discharged after treatment for tuberculosis of the lungs was 107. In 20 per cent. of these the disease appeared to have become quiescent, in 48 per cent. the patients' condition had improved, usually to a great extent, in 8·5 per cent. the condition was unchanged, in 2·8 per cent. the patient was worse, and 20 per cent. of the patients had died. Under the after-care scheme, cases of non-pulmonary tuberculosis are re-examined at regular intervals after discharge.

DOCTORS AND CHIROPODISTS

Several members of the medical profession were present at the annual dinner of the Scottish branch of the Incorporated Society of Chiropodists. Dr. R. W. Craig said that the medical profession had come to realise more and more the value of the work done by the Society's members, and he regretted that the British Medical Association had declined to recognise the Society. Mr. T. M. Millar, F.R.C.S. Edin., who has worked in close association with members of the Society of Chiropodists for some years at the Edinburgh Foot Clinic and at the Edinburgh School of Chiropody, said that many patients were sent to the Foot Clinic from local hospitals and also by general practitioners. During the past year 15,000 patients were treated at the clinic. Arrangements have been made for the nurses at the Royal Infirmary, and for the tramwaymen of the Edinburgh corporation transport department to have the benefit of chiropodist treatment.

MEDICINE AND THE LAW

Lightning as an Industrial Risk

SINCE 1932 statistics have been kept of the trees struck by lightning. They show that the oak, elm, conifer, poplar, willow, and ash are (in that order) the most frequently struck; the beech, birch, horse-chestnut, and holly are, according to this census, immune. These particulars were given last Saturday in a lecture at the Horniman Museum by Mr. Sidney Dark, vice-president of the South London Botanical Institution. The lecture included some observations on safety in thunderstorm, the possible danger of holding an umbrella, and so on. Such information is occasionally significant in the medico-legal field also, since compensation can be recovered under the Workmen's Compensation Act if the workman is struck by lightning where the circumstances of his employment expose him to some special risk of it, but not if he merely runs the ordinary risk to which everyone else is exposed. This distinction was vital in a recent case at Retford county court (Asher *v.* Thompson) where the workman was struck while hoeing cabbages in the rain. A man working alongside said that the deceased held his hoe in his left hand. The widow contended that the lightning travelled down her husband's left side; this would suggest that his grasp of the tool for the purpose of his work had exposed him to special risk by attracting the lightning. An electrical engineer expressed the opinion that death was due to a "minor thunderbolt." Another engineer, giving evidence on behalf of the employer, denied that the metal part of the hoe would influence a flash of lightning containing a million volts; it would, he said, make no difference

whether the workman held 1 hoe or 12 hoes or a steel bar. Apart from the difficulty of proving the attraction of the electricity, the medical evidence was inconclusive. A doctor described the dead man's injuries as follows: the hair was singed, there was a wound on the left side of the face (which might have been caused by the fall), and a burn on the right thigh, and there were marks on the right ankle and leg. The county court judge said that the mere fact of death by lightning did not in itself make the employer liable under the Workmen's Compensation Act and he dismissed the claim.

Andrew *v.* Failsworth Industrial Society (1904) is a case where the courts were able to award compensation for injury due to lightning. A bricklayer was struck while working on a scaffold 23 feet from the ground. An expert in electrical engineering told the county court judge that the workman in his exposed position constituted a "well-defined point at which a discharge would be more likely to occur"; the higher he ascended, the smaller the zone of safety. In the Court of Appeal the Master of the Rolls observed that lightning was notoriously erratic, and that perhaps no position was absolutely safe; but, if a particular vocation in particular circumstances adds something appreciably and substantially beyond the normal risk, the injured workman might be awarded compensation. The bricklayer's case is usually contrasted with an unsuccessful Irish claim a few years later (Kelly *v.* Kerry County Council) where a road-worker was struck by lightning while working on the highway in a storm. It was held that the road-worker ran no special risk beyond what might have befallen anyone else on the road at the time. In another class of case the employer may be liable to pay compensation on account of lightning where the consequence is indirect. In Thom or Simpson *v.* Sinclair (1917) workers inside a building were hurt by the fall of the roof. The House of Lords held them entitled to compensation whatever the cause of the roof falling. If the cause was the inherent weakness of the employer's roof, or the toppling over of an adjacent wall or a stroke of lightning, the result to the workers was an accident arising out of their employment. Compensation, therefore, is more likely to be payable where lightning is an indirect cause of injury than where it strikes the workman directly.

Fees for Court Attendance

Two recent claims for fees for attendance at court by medical witnesses may perhaps be noted, though they raise no novel principle. In one a doctor sued at the Clerkenwell county court for a fee of 35 guineas for attending at the Westminster police-court to give evidence on behalf of the defendant's daughter who had been charged with obtaining goods by false pretences. The daughter had pleaded "guilty" at the police-court a week earlier and then sought to change her plea to "not guilty"; the police-court magistrate declined to allow the change of plea or to hear further evidence, and in consequence the doctor was not called. Lay newspapers gave some prominence to a statement by the plaintiff at the county court to the effect that it would be unprofessional to go to a court to give evidence without charging a fee, even if not called as a witness. Naturally if a doctor's expert evidence is required by a defendant, there is the usual presumption that it will be paid for; medical witnesses who kick their heels in the precincts of a court are meanwhile losing fees which they might earn in the consulting-room. It would be highly improper if the result of the case made any difference to the medical witness's fee; he does not give evidence as a speculation. The case was clear and the county court judge gave judgment for the sum claimed with costs.

In the second case, at Bristol assizes, a medical witness asked for his fee in a criminal case—apparently a charge of manslaughter against a motorist—where he had been required to attend at the court to prove the fact of death. The defendant seems to have pleaded "not guilty" at first and then to have pleaded "guilty." Mr. Justice Swift complained of "the absurd waste of public money" in calling several witnesses to give the same evidence. "Everybody agrees," he said, "that a man is killed, and yet we have a doctor to prove he is dead, a nurse to prove he is dead, and an ambulance driver to prove he is dead; the doctor quite rightly says 'before I say he is dead I want £8 14*s.*'; the nurse says 'before I say he is dead I want £5 11*s.* 6*d.*'; and what in the world the ambulance man will want I haven't the faintest idea." This was of course a humorous exaggeration, as the allowances are prescribed by statutory rules. The judge's complaint was not aimed at the medical profession; he expressed regret to the doctor and nurse that they had been unnecessarily brought to court. He was of opinion that these witnesses might have been bound over conditionally so that they would not have been brought to court unless specially required. Presumably the prosecution, unaware of what the plea would be, felt obliged to be in a position to prove its case solidly.

Inquests and Publicity

Recent criticisms of coroners' inquests may be revived by the inquest on the two sisters who threw themselves from an air liner. They left behind them letters which clearly established the intention to commit suicide; the two girls had evidently been devoted to two flying officers who were lately killed. The father of the girls asked that the letters should not be published. The coroner very properly ruled that the letters were material facts for the jury to consider. He took, however, no steps to prevent the publication of the full text; critics will naturally point out that the jury could quite well have read or heard the letters privately and nobody would have accused the coroner in that event of having improperly suppressed evidence. The Home Office committee on coroners commented in 1909 on the "gratification of public curiosity," and Mr. A. P. Herbert has criticised "the kind of coroner who forgets that it is his duty to investigate the death of the deceased and not the lives of the living." These comments and criticisms could be largely met without any change of the law if coroners used their present powers. In the recent case, though the whole of the girls' letters was material to show the state of their minds, the feelings of the living might have been spared by a judicious selection of the sentences read in public. One girl wrote, for example, that one of the dead officers was about to break off his engagement with his fiancée: that seems just the kind of passage which could have been omitted without interfering with the administration of justice.

WEST NORFOLK HOSPITAL.—The Queen recently visited this hospital at King's Lynn to open the new out-patient and medical block. Her Majesty inspected the new wing and received from 200 contributors purses which contained the sum of £3850. The development scheme of the hospital will have cost £60,000 when it is completed.

CORRESPONDENCE

THE RECOGNITION OF OSTEOPATHY

To the Editor of THE LANCET

SIR,—I have read with a great deal of interest your leading article in THE LANCET of Jan. 12th under this title, and also the memorandum by the British Medical Association on the Status of Osteopathy. These articles prompt me to comment on the practice of osteopathy in the United States.

In the United States the practice of the healing art is controlled by a special board in each individual State of the Union, and there is a lack of uniformity in their licensure acts. In order to help control the practice of the various cults, a basic science law has been passed, and is in effect in eight States of the Union and the district of Columbia. This basic science law requires that everyone licensed to practise the healing art shall pass an examination in the basic sciences before a commission on licensure. Of course osteopaths have sought the privilege of practising in hospitals, and have especially urged this in tax-supported hospitals.

The American College of Surgeons, as you know, has a Minimum Standard for Hospitals, on the basis of which it issues a certificate of approval to those hospitals complying with it. The College does not give this approval to hospitals which extend their privileges to osteopaths. The clause from the Minimum Standard reads as follows:

> Membership upon the staff be restricted to physicians and surgeons who are (*a*) full graduates of medicine of an acceptable medical school with the degree of doctor of medicine, in good standing and legally licensed to practise in their respective States or provinces . . .

The American Hospital Association has a set of standards for hospitals which constitute its membership. This organisation does not admit to membership those hospitals extending their privileges to osteopaths. One of their qualifications for hospitals admitted to membership in the Association reads as follows:

> The hospital must be conducted in an approved and ethical manner, well-staffed by competent physicians who are graduates of recognised colleges of medicine conferring the degree of doctor of medicine, who are licensed to practise medicine in the State in which they reside, and who are *eligible* for membership in the county medical society. The professional staff must not include osteopaths, chiropractors, or practitioners of other cults of this character.

The American Medical Association, in its "Essentials in a Hospital Approved for Internes," in referring to the character of the hospital staff, decrees: "There must be an organised staff of ethical physicians who hold the degree of doctor of medicine from acceptable medical schools," &c. "The hospital must not only confine membership on its staff to reputable practitioners who have received the degree of doctor of medicine from medical schools considered acceptable by the Council on Medical Education and Hospitals of the American Medical Association, but also must apply this ruling to every person permitted to treat or prescribe for the sick in the hospital, or in any of its departments. The ruling does not apply to the treatment of patients by nurses, masseurs, and other like assistants, when acting under the orders of any attendant on the medical staff."

It is the very definite feeling of the American College of Surgeons, and other organised associations of doctors of medicine in the United States, that anyone who attempts to practise the healing art should comply, as a minimum, with all of the requirements of the full medical curriculum—the same requirements as are stipulated for doctors of medicine.

I fully agree with the following statement, which appears as the closing paragraph of the Summary and Conclusions of the memorandum prepared by the special committee of the British Medical Association:

> 4. The proposed statutory recognition of a Register of Osteopaths comparable to the Medical Register is unnecessary, and would cause confusion in the public mind. If the persons desiring such registration have passed through the medical curriculum and have qualified, the Medical Register is open to them; if they have not had this training they have not satisfied the requirements which the law deems necessary for those who profess to be qualified medical practitioners. Osteopaths claim to undertake all forms of medical practice; why, then, should they not comply with the conditions accepted by others? A multiplication of Registers having different standards and different values is plainly not in the public interest (paras. 22 and 23).

I am, Sir, yours faithfully,

FRANKLIN H. MARTIN,
Director-General, A.C.S.

Feb. 2nd.

To the Editor of THE LANCET

SIR,—Osteopathy of to-day has travelled a long distance from the principles taught by the founder. Since its beginning in the little frontier town of Kirksville, in the State of Missouri, it has had a remarkable growth, and is now recognised as a method of practice by a number of States of the Union. This result is only in part due to osteopathy as originally conceived—namely, that disease is caused by misplacement of bones and joints and can be cured by readjustment. To a great extent the spread of osteopathy depended on the belief of credulous people in the mysterious power of cults. Its spread was also furthered by the activity of osteopaths and their political adherents who influenced State legislators to give osteopaths the privilege to practise. More recently they have acquired even further legal rights by adopting many therapeutic methods of regular medicine. The medical profession of this country has always been dignified in its opposition to the granting of undeserved privileges to the osteopaths. It seemed unfair for the State to demand of regular physicians a long and arduous course of training and then allow osteopaths to come in through the back door and to have nearly all the rights that the regular profession enjoys. Quite recently the governor of the State of New York vetoed a Bill authorising osteopaths to engage in any form of medical practice except the giving of drugs by mouth to cure disease and the performance of certain specified operations.

In discussing osteopathy we have to differentiate between the original cult and that of to-day. Originally osteopaths ascribed all diseases to displacement of bones, a conception that must appear preposterous to anyone who knows something of pathology and bacteriology. Equally absurd is the claim made by the early osteopaths that all drugs are poisonous. Such a statement can impress only those who do not know the value of quinine, mercury, digitalis, laxatives, not to speak of morphine, the greatest boon to sufferers from hopeless, painful disease. That osteopaths treat whooping-cough, scarlet fever, pneumonia, and diphtheria by manipulation only, must

seem to anyone acquainted with the origin and nature of these diseases the height of irrationality. No doubt a goodly number of children get well, not because of osteopathic treatment but in spite of it. The honest physician under whose ministrations, perhaps with few or no drugs, the patient recovers from an acute infectious disease, would not claim too much credit for himself but would ascribe the recovery largely to the powers of nature. The Vis medicatrix naturæ was known to Hippocrates, yet osteopaths claim the discovery of this 2000-year-old fact for A. T. Still, their founder and patron saint. It is also claimed for him that he was the first to recognise that the body has an immunity toward certain diseases, something that is as old as the hills and is well known to the laity.

Of late years the osteopath, finding that osteopathy would not cure everything, has found it necessary to use surgical measures, and this has led him to the study of surgery. He also discovered that his aversion to drugs was not altogether rational, and he began to use them. This is unlawful in some States but is permitted in others. It indicates a radical departure from the original cult. The osteopaths have also become aware of the fact that focal infections may play a part in disease in addition to mechanical displacements. Thus a pamphlet issued by the American Osteopathic Association of Chicago advises that peptic ulcer be treated as a preliminary to osteopathic manipulation of the spine by the removal of diseased tonsils, bad teeth, &c. Thus osteopathy, like homœopathy before it, has gradually discarded its original principles and approaches more and more the practice of medicine. If that is the trend, why should the osteopath not be required to have the same preparation as any other practitioner of the healing art. To-day the homœopath in my country has to have the same preliminary education, the same premedical training, and the same medical course as any other doctor of medicine. His preparation is differentiated only in that it contains some teaching of homœopathy, which however few really follow in after life. The homœopaths are now highly respected members of the medical profession and regular physicians consult freely with them. I see no reason why anyone who chooses to select osteopathy as a specialty as another man might select roentgenology or laryngology, should not go through the same regular preparation in anatomy, physiology, pathology, bacteriology, biochemistry, hygiene, diagnosis, obstetrics, and surgery as any other specialist. If the osteopath does not have such training, then he has no right to practise medicine under any name whatsoever. His position before the law should be that of the chiropractor, the electrotherapeutist, or any other who make use, or ostensibly make use, of only one therapeutic method. His main function would then really be to assist the physician in the treatment of such diseases in which manipulation may be useful, and that osteopathic manipulation sometimes helps is proved abundantly. But it is not a universal panacea and does not constitute the practice of medicine as a whole.

It is interesting that the Philadelphia College of Osteopathy, one of the best in the country, whose catalogue has not a word to say about the founder Still or about the original principles of osteopathy, gives a four years' course and requires for admission a four years' high school course and one year of college. This is about what the best medical schools used to require up to a few years ago. It is an interesting commentary on the state of osteopathic practice that in the Philadelphia College therapeutics and—shades of A. T. Still—prescription writing are taught. Little wonder that nothing is said in the catalogue about the original principles of osteopathy.

If osteopaths are practising the osteopathy of A. T. Still, then they are not entitled to be recognised as medical practitioners but only as representatives of a special type of mechanotherapy. If they are practising osteopathy, so-called, as it is now taught in their best schools, then they are entitled to larger rights but only on condition that they submit to the same fundamental training required of all persons who appear as doctors or physicians before the public.

I am, Sir, yours faithfully,

Philadelphia, Feb. 7th. DAVID RIESMAN.

THE PLACE OF SURGERY IN THE TREATMENT OF PEPTIC ULCER

To the Editor of THE LANCET

SIR,—I would like to congratulate Mr. Ogilvie on his most admirable and stimulating address which appeared in last week's issue. It is not unnatural, however, that where the subject is so controversial, some minor points should come in for criticism.

In the first place Mr. Ogilvie says, apropos of the more limited type of operation, that the conclusions of American surgeons have very little bearing on the ulcer problem in this country. He states that it has been stressed by American writers that the type of ulcer encountered in Europe is different from that prevalent in America. What American writers such as Walters and Snell really said was that the ulcers met with in America appeared to differ from those in Germany and Central Europe. England was specifically excluded. My own opinion, after spending several years in a large American surgical clinic, taken in conjunction with an extensive experience of the ulcer problem in this country, is that there is no obvious difference in the morbid anatomy, symptomatology, and response to treatment between ulcers in this country and America. If results from limited operations appear to be better in America it may be because the patients there are largely private patients who are more careful with their diet afterwards. On the other hand, a recent tour round the surgical clinics of Germany, Austria, and Hungary has convinced me that the ulcers there tend often to be of a more severe type than are commonly met with in this country or America. On the Continent multiple chronic ulcers of the stomach are not infrequent, and a high degree of gastritis, even with duodenal ulcer, is quite common.

With regard to the incidence of marginal or jejunal ulcer following gastro-enterostomy, I am in agreement with Mr. Ogilvie that 2 per cent. is much too low a figure, and that if surgeons went into a more careful investigation of their patients in whom they had assessed the after-result as "fairly good," or even "very much improved," they would come across a considerable number of gastrojejunal ulcers. In an investigation which I carried out recently on 100 cases of gastro-enterostomy, operated upon by myself from two to eight years ago, I came upon 2 patients who, while enthusiastic about the success of their operation, admitted to a little flatulence occasionally when they took any dietetic liberties. On fluoroscopic examination it was found that both had small gastrojejunal ulcers. On the patients' own statements the results would have been classified as "good" or even "very good." It will be seen, therefore, that with gastrojejunal ulcer, as with duodenal ulcer, the symptoms may be quite mild, and when it is remembered that the detection

of a small marginal ulcer by radiography may be exceedingly difficult, it will be obvious that there is here a possible source of error in all statistics. At the same time, I consider Garnett Wright's figure of 8·75 per cent. nearer the truth than Mr. Ogilvie's estimate of 20 per cent., for I do not think it can be assumed that because a patient has changed his address and cannot be traced he has a gastrojejunal ulcer.

These figures I feel sure could be improved if the operation of gastrojejunostomy were actually confined to cases of marked pyloric narrowing and gastric delay. It is a point much emphasised by surgeons in their writings: I wonder if they always adhere strictly to it in their practice. The patient with the high-acid rapidly emptying stomach might reasonably remain on medical treatment a little longer or until we learn how those who have lost three-quarters of their stomach are bearing up at the end of 10, 15, or 20 years.—I am, Sir, yours faithfully,

Glasgow, Feb. 25th. ROBERT MAILER.

TREATMENT OF MYASTHENIA GRAVIS WITH "PROSTIGMIN"

To the Editor of THE LANCET

SIR,—Dr. Mary Walker's discovery of the use of Prostigmin in the treatment of myasthenia gravis is one of great importance, not only from the point of view of therapeutics but also because of the light it throws on the causation of this disease.

One of the cases which she showed at the Royal Society of Medicine on Feb. 8th was under my care for three years; it was reported (Case 2) in a paper dealing with the treatment of myasthenia gravis with ephedrine which appeared in these columns last year. Although the response to this drug was quite good for the first two years, ultimately the disease progressed despite it. Owing to the kindness of Dr. Walker I was given the opportunity to re-examine this patient on Feb. 20th. She showed bilateral ptosis, complete external ophthalmoplegia, marked weakness of the facial muscles, and about 80 per cent. loss of power in both hand-grips and in dorsiflexion of the feet. The arm-jerks were absent and the lower limb jerks just obtainable. She was unable to sit up in bed and her voice was so feeble that it was difficult to understand her. She was then given an injection of 5 c.cm. of prostigmin with gr. 1/100 of atropine. Three minutes later the ptosis had disappeared and a minute afterwards vertical ocular movements began to return. At the end of six minutes she was sitting up in bed and three minutes later ocular movements were full. Both hand-grips were now normal, and the deep reflexes in the arms had returned and those in the legs were brisker. She then got out of bed, put on her dressing-gown, and walked the length of the ward. Fifteen minutes after the injection was given she was able to use, with apparent ease, a heavy floor-sweeper. That similar improvement may be expected in all cases of myasthenia gravis treated with prostigmin seems probable from the confirmatory reports of Dr. Blake Pritchard.

The work of the late Prof. W. E. Dixon and of Sir Henry Dale on the physiological chemistry of the parasympathetic and sympathetic endings, which was referred to by Dr. Pritchard in his paper in your last issue, receives striking confirmation from this new discovery, and further clinical applications of their work will doubtless now receive the overdue attention of clinicians.

It would appear that the optimum dose for severe cases is 5 c.cm. of prostigmin; the effect of the drug lasts for five to six hours, depending upon the activities of the patient. The price at present ruling for this drug places it beyond the reach of the hospital class of patient except for short periods. It is to be hoped that in the near future the manufacturers will succeed in isolating the component of physostigmin which is active in myasthenia gravis and will make it available in a cheaper form than is at present possible. There is no reason why ephedrine should not be given to tide over the periods when the patient is not receiving prostigmin.

Dr. Walker must be heartily congratulated on her discovery which will enable the unfortunate sufferers from this disease to enjoy many of the pleasures of life of which they have formerly been deprived.

I am, Sir, yours faithfully,

London, W., Feb. 22nd. DOUGLAS MCALPINE.

To the Editor of THE LANCET

SIR,—I have read with great interest Dr. Blake Pritchard's paper in your last issue (p. 432). When I was house physician at the Royal Infirmary, Liverpool, in 1883 there was a case of chorea major which had resisted treatment and was thought likely to prove fatal. It occurred to me to try eserine sulphate hypodermically in doses of gr. 1/100. After one or two injections the spasms ceased, and the patient made an uneventful recovery, but I never had another opportunity of testing this treatment. Are these two diseases, myasthenia gravis and chorea major, related?

I am, Sir, yours faithfully,

Feb. 25th. T. PAGAN LOWE.

THE DEAF-MUTE

To the Editor of THE LANCET

SIR,—I congratulate Mr. Philip Franklin upon his participation in the great possibilities which appear to open up a new and fascinating vista in the treatment of the deaf child in the future. My only objection to the paper is the use of the word "deaf-mute," a term which applies to a very small section only and is misleading to the public. The "deaf child," on the contrary, embraces every grade from the stone-deaf to the slightly deaf and certain forms of aphasia.

Mr. Franklin gives his paper the sub-title of "A Plea for the Deaf Child" and, which is of equal if not more importance, pleads for early education. I have been pleading for the deaf child for over 30 years, and you, Sir, have, from time to time, been good enough to give my pleas prominence in your columns. In 1910 I advocated the earliest possible education of the deaf child at the International Congress of School Hygiene in Paris, and I have persistently advocated it ever since, and my latest expressed opinions on deaf education (the result of a quarter of a century on the staff of the L.C.C.) are now appearing in the *British Journal of Children's Diseases*. The whole system of deaf education in this country is in need of thorough supervision and drastic changes. It is greatly behind modern progress, partly because the weak Act of 1893 fixes the age of education of the deaf child at 7, when that of the normal and the blind child is 5, a ridiculous fiat which is against all reason and experience. Partly also the disability of deafness in children is far less spectacular than that of blindness and public sympathy is not aroused by it. Consequently public authorities find that they can neglect deaf education with impunity, and, since the recent Eichholz report

has supported this attitude, educational authorities have been enabled to use the deaf in their rush to carry out "economies" which look well on paper. The Eichholz report has, indeed, put back the clock of progress in deaf education for at least a generation.

The new generation of pleaders has the advantage of new apparatus and inventions which were unknown to the last generation. I trust that it will not receive the same discouragement as its predecessor. My own efforts have been described in a report of the L.C.C. as "pioneer work," which is the only recognition it has so far received.

I am, Sir, yours faithfully,

Harley-street, W., Feb. 22nd. MACLEOD YEARSLEY.

"SECONDARY MARBLE BONES"

To the Editor of THE LANCET

SIR,—Dr. J. F. Brailsford, in his interesting letter in your last issue, gives reasons why he suggests that "the term 'marble bones' be restricted to the osseous dystrophy first described by Albers-Schönberg." It seems to me that a merely descriptive term, such as "marble bones," cannot be restricted in that way, unless preceded by the word "primary" or by the name of the introducer of the term, Albers-Schönberg. Similarly, I think that the term "osteitis deformans" should not be restricted to Paget's bone disease, unless accompanied by Paget's name. An osteitis of congenital syphilis may sometimes be more or less symmetrical, and in rare cases may actually "out-deform" Paget's osteitis deformans, just as in rare cases a more or less symmetrical "secondary marble bones" may even "out-marble" the primary marble bones of Albers-Schönberg.

I do not believe that Dr. Brailsford is right in speaking of the abnormality in primary marble bones as an osseous *dystrophy*. There is no proof that it is due to faulty bone nutrition; it is more likely to be an osseous *dysplasia*, due to faulty development inherent in the bones themselves.

Not all metastases from prostatic carcinoma cause a reaction manifested by increased bone-formation. This doubtless varies in different cases, but even in one and the same case of malignant endocarditis (if I may adduce an analogy from another disease process) some emboli have been found to cause suppuration and others not.

I am, Sir, yours faithfully,

London, W., Feb. 23rd. F. PARKES WEBER.

TREATMENT OF FRACTURES

To the Editor of THE LANCET

SIR,—There must have been many who, like myself, read with pleasure the letter of Mr. Hosford in your last issue entitled Period of Incapacity in Fractures. It is always peculiarly difficult for the practitioner of general medicine to compile statistics. Fortunately, in a country district such as this we deal with people who gain little and lose much by incapacity and are anxious for full functional recovery. Incapacity period is influenced by age, desire to work, possibility of light work; but to my mind most of all by immediacy of treatment and continued personal supervision. While prepared to treat with deference the B.M.A. published figures and also those of Mr. Hosford, there may be, I would suggest, practitioners of general medicine who will feel no need to lose their self-respect entirely.

Rigid plaster-of-Paris cases, usually made so that they can be split open after a few days, seem eminently suitable for a great variety of fractures, and to my mind ought largely to replace the use of stock splints. Frequently, after discarding rigid immobilisation, elastic bandages can be used with advantage. X ray facilities on the spot are of course essential.

I write this letter in the hope that others in like position who can produce lists fuller than my own may be induced to do so, and perhaps show the special benefit to the patient of personal and immediate treatment; possibly also that "incapacity periods" are not quite so bad as might be supposed from the B.M.A. Report. The following unselected list occurred and was wholly treated in my practice in the last three years. I have three unsatisfactory results: (1) death of a woman of 72 with fractured tuberosity of humerus shortly after the accident; (2) death after ten months of a hemiplegic man of 78 with paracephalic fracture of femur without osseous union; (3) radial deviation following Colles's fracture in a woman of 76 who refused open operation. In all other cases there is perfect functional recovery. There was only one compound fracture.

Clavicle	3	Femur—	
Scapula	1	Head and neck	3
Humerus—		Shaft	3
Tuberosity	1	Tibia	1
Surgical neck and shaft	3	Tibia and fibula	1
Lower end	3	Fibula	1
Radius	1	Foot bones	2
Radius and ulna	7	Ribs (multiple)	3
Colles	7	Nasal bones	1
Hand bones	5		

I am, Sir, yours faithfully,

Bourne, Feb. 22nd. W. B. R. MONTEITH.

CLINICS FOR BIRTH CONTROL

To the Editor of THE LANCET

SIR,—Your correspondent Dr. R. N. Goodman may be interested to learn that at the Constructive Birth Control Society's clinic at 108, Whitfield-street, London, W., medical practitioners have the opportunity of learning something of birth control technique. A lecture, followed by a practical demonstration, is given free to doctors on the first Thursday of each month (July, August, and September excepted) at 2.30 P.M. As accommodation is limited those wishing to attend should apply to the secretary beforehand for tickets. There is also a museum of contraceptives and a birth control library which may be consulted any day, except Saturday, between 10 A.M. and 6 P.M. Dr. Goodman complains of the cost of apparatus, but from the clinic doctors can obtain the required appliances of good material and at a very low cost.

I am, Sir, yours faithfully,

Feb. 23rd. E. FISHER, M.D., D.P.H.

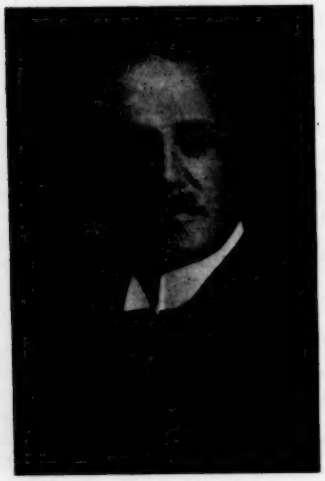
FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A week-end course in clinical surgery will be held at the Royal Albert Dock Hospital (March 9th and 10th); a week-end course in chest diseases at the Brompton Hospital (March 23rd and 24th). Longer courses include orthopædics at the Royal National Orthopædic Hospital (Feb. 11th to 23rd); clinical medicine and surgery at the National Temperance Hospital (March 14th to 20th); thoracic surgery at the Brompton Hospital (three days a week from March 4th to 29th). Further particulars may be had from the Secretary of the Fellowship, 1, Wimpole-street, London, W.1.

OBITUARY

JAMES NEAL, M.R.C.S. Eng.

GENERAL SECRETARY OF THE MEDICAL DEFENCE UNION

Dr. Neal, who died on Sunday last at his home at Golders Green, was born at Birmingham in 1866, where his father, Dr. James Neal, was then in practice but soon after removed to Sandown, I. of W. James fils went to Epsom College when he was 12 years old, and when he left in 1884 he studied medicine, as did his father before him, at Queen's College, Birmingham. After qualifying in 1891 he practised at Small Heath, in partnership with the late Dr. J. F. Taplin, acting as surgeon to the Great Western Railway Company and to the Royal Small Arms Factory. He was by nature and upbringing inclined to reflect on the economic problems of medicine, and it was not long before he became hon. secretary of the Birmingham and District General Practitioners' Union, as well as editor of the *Midland Medical Journal*. The confidence of his colleagues in his practical ability led to his nomination by the central division of Birmingham on the representative body of the B.M.A., on whose central ethical committee he also served. In 1912, with 20 years' experience of general practice, he was appointed deputy medical secretary of the B.M.A.; in the same year he was a member of the State Sickness Insurance Committee and of the first advisory committee set up under the National Insurance Act. After serving the B.M.A. for seven years, during which his sound judgment and unfailing courtesy won general respect, he was offered the post of secretary to the Medical Defence Union rendered vacant by the death in April, 1919, of Dr. A. G. Bateman.



DR. NEAL

It was then, at the age of 53, that Dr. Neal may truly be said to have come into his own. He had gained in Birmingham an intimate knowledge of the difficulties which beset medical practitioners, and at the London office an ever-increasing knowledge of the best means for meeting these difficulties; coupled with this was the fullest sympathy for any who were suffering from unwarranted accusation or excusable error, which made him a pillar of strength to all who came to him as the chief executive officer of the Medical Defence Union. Those who listened month by month at the council meeting to Neal's presentation of the numerous and varied problems which came before the Union learnt how easy to him was the preparation of the lucid précis and how rare were the occasions when the considered judgment of the council ran counter to the decision at which he had already arrived. Within the office he had a flair for administration and especially for the choice of assistants, with the result that the Union always had at command a group of highly efficient and trustworthy clerical assistants. To the officers of the Union his death means the loss of a true friend and a valued colleague. Mr. Eric Pearce Gould, the president, writes: "My own personal respect for his judgment and ability was profound, and I quickly learned upon becoming one of the Union's officers that the welfare of the Union and its members was his absorbing interest. To this he was ready at all times to subordinate his own concerns. The care and courtesy with which he initiated me into the business of the Union were but typical of the way in which he treated all who sought his help." And Mr. O. A. Hempson, solicitor to the Union, in mourning the loss of a friend, colleague, and collaborator, adds: "As secretary to the Union, Dr. Neal possessed that happy combination of firmness and tact which enabled him to impress an unworthy or mistaken claimant with the unyielding weight of the Union without inflaming his sense of grievance. So much of the ultimate success of an action or defence is made or marred by the initial correspondence or opening tactics, and it is only right that members of the Union should appreciate their debt to Dr. Neal in this respect. He possessed a gift of being able to separate the essential from the non-essential and of sensing the strength or weakness of a case which is seldom found save in those trained to the law."

Dr. Neal is survived by his widow, daughter of the late Mr. E. L. Tyndall, and two children, a son and a daughter.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. A. H. Harkins to *Iron Duke*, on recommg., and E. Heffernan to *Victory* for R.N.B.

Surg. Lt.-Comdrs. A. A. Pomfret to *Victory* for Haslar Hosp., R. G. Anthony to *President* for course, D. C. Drake to *Drake* for R.N.B., C. Keating and J. Cussen to *Victory* for R.N.B., E. J. K. Weeks to *St. Angelo* for Malta Hosp., J. C. Souter and E. B. Pollard to *Pembroke* for R.N.B., E. C. Davis to *Pembroke* for R.N.B., and G. D. J. Ball to Hospital Ship *Maine*.

Surg. Lt. H. A. Clarke to be Surg. Lt.-Comdr.

Surg. Lts. P. N. Walker-Taylor to *Rochester* and G. D. Webb to *Arethusa*.

Act. Surg. Lts. (D) R. L. Ferris to *Pembroke* for R.N.B., K. E. J. Fletcher and A. C. Horne to *Victory* for R.N.B.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Comdr. J. Lorimer transferred from List 2 of the East Scottish Division to List 2 of the London Division.

R. W. G. Lancashire entered as Proby. Surg. Lt. and attached to List 1 of the Mersey Division (headquarters).

ROYAL ARMY MEDICAL CORPS

Capt. W. A. Kerr relinquishes his temp. commn.

TERRITORIAL ARMY

Col. G. W. Miller (retd.) to be Hon. Col., R.A.M.C. Units, 51st (Highland) Div., vacated by Col. D. Rorie (retd. T.A.), on completion of tenure.

Lt. T. M. Reid to be Capt.

James Tidd (late Cadet, Hillhead High Sch. Contgt., Jun. Div., O.T.C.) to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. J. L. Johnston, having attained the age limit, relinquishes his commn. and retains his rank.

Lt. G. Morgan, from Active List, to be Capt. with seniority 1st May, 1934. (Substituted for the notification in the *Gazette* of Dec. 28th, 1934.) (*Vide* THE LANCET, Jan. 5th, 1935, p. 47.)

(*Continued at foot of opposite page*)

PANEL AND CONTRACT PRACTICE

Mileage: a New Census

AN insurance doctor's agreement with his insurance committee confines the area of his contract service at the ordinary capitation rate of payment to that of a circle of two miles radius from his official residence. This works quite satisfactorily in towns, where outside the two-mile radius there are available a number of doctors from whom the choice may be made. But in the country insurance doctors often have many patients living three, four, five, six, or more miles from their official residences. If the access is reasonable, such doctors are paid ordinary mileage allowance—namely, one unit of mileage for every mile or part of a mile beyond two miles; but special claims may be made for the time and cost of travel to places which are of difficult access, and these are paid from a special mileage fund. Dr. A. may claim (say) 560 units for mileage amongst his insurance patients with, in addition, 20 claims for places of difficult access. Dr. B. may put in claims for 900 units of mileage together with 2 claims for special mileage. The total units claimed by all doctors in England such as A. and B. for ordinary mileage is divided into the sum of approximately £205,000 to give the financial value of the unit. The Government allow £250,000 for mileage included in which is a sum of £10,000 to help subsidise doctors who live in sparsely populated areas where it would not be possible for a resident doctor to make an adequate living owing to the smallness of the population. The remainder of the balance, approximately £35,000, is paid out in special mileage claims. The actual figures for the county of Devon in 1928—the last date on which investigation of special claims was made—were for ordinary mileage £9170, for special mileage £3049. Investigation of special mileage is undertaken by the regional medical staff of the Ministry of Health. Each case is investigated separately, and as in 1928 the results were very little different from that of 1920 it has not been thought worth while, as it is very expensive, to have this investigation done again at present.

For ordinary mileage, however, the whole country has had to submit new claims for the year 1934. This was largely due to some evidence from Yorkshire last year that one of its committees had received claims for 6000 more people, all of whom were proved on investigation to be genuine, whereas £2 less money had been received from the fund. Patients move about the country; doctors open branch surgeries; new doctors settle down in places previously without a doctor; and new roads in the country all alter mileage claims. It was thought last year that if the experience of Yorkshire was general the new returns would show a very great fall in the value of the mileage unit. Actually this did not prove to be so. The total units in 1931 were found to be 2,959,915; the mileage fund was £205,303, which equals 16·6 pence per unit. In 1934 the total units were found to be 3,109,499; the mileage fund was £205,542, which equals 15·8 pence per unit. The value of the unit has thus only gone down less than one penny over the whole country.

The claims made by the various committees in 1934 show that West Yorkshire, Essex, and Cornwall have the largest increase in mileage claims, whilst Coventry now claims for 1604 units (or £91), instead of 612 units (or £35) in 1931. Probably the 1934 figures are quite accurate, for doctors are now expert in making such claims, and it is to their financial advantage to do so. The distribution committee in January, 1930, decided that in making such claims the distance was to be taken from the patient's residence to that of the doctor of choice, but some insurance committees, with the concurrence of the panel committee, still only pay mileage calculated on the distance from the patient's house to the nearest available insurance doctor. Mileage can also be claimed for attendance upon a temporary resident living (say) five miles away. Such claims have been dealt with in the past by payment from the ordinary mileage fund of the particular insurance committee which receives the claim. The mileage units of any particular doctor will vary from quarter to quarter as patients move about in his practice or out of his area, so that such temporary residents' mileage claims, being few in number, were not noticed by the officials of insurance committees who dealt with them, nor by the other doctors of the area. As they had not been allowed for when returns were sent for ordinary (as distinct from temporary resident) patients, they were extra claims on the mileage fund, thereby reducing—although very slightly—the value of the unit to all doctors in that area for mileage.

In various parts of England, however, there have been established labour camps which are usually situated in places of quite difficult access, and miles away from a doctor. The insured persons in them never stay longer than three months, and are therefore always treated on the temporary resident bases with mileage claims in addition. They therefore never become ordinary patients on a doctor's list in that locality. These mileage claims are a very heavy burden on the local mileage fund. They have not been taken into account in the central distribution of the country's mileage fund for the reason that doctors when asked to submit returns for mileage only work out their mileage claims for patients on their actual lists. Temporary residents are an unknown quantity, both in numbers, for they only send when they are ill, and for mileage, because the doctor does not know where they will be living until they do send for him. The result of these extra claims on the local mileage fund is that, as there is only the sum allocated to the local committee to distribute, they much reduce the value of the mileage unity in such areas.

It is hoped that committees with such camps in their areas will shortly formulate some scheme for discussion with the Ministry which will load their mileage returns for the area. It may then be possible to allocate more money for the ordinary mileage fund to that committee.

(*Continued from previous page*)

ROYAL AIR FORCE

Wing Comdr. A. E. Barr-Sim to No. 1 Air Defence Group Headquarters for duty as Principal Medical Officer, vice Wing Comdr. R. S. Overton.

Squadron Leaders E. N. H. Gray to Station Headquarters, Bircham Newton, for duty as Medical Officer, and A. Harvey to Central Medical Establishment for duty as Medical Officer.

Flight Lt. A. L. St. A. McClosky to Station Headquarters, North Weald.

Flying Offr. I. Mackay is promoted to the rank of Flight Lt.

INDIAN MEDICAL SERVICE

Lt.-Col. (Bt. Col.) H. E. Stanger-Leathes to be Col.

Lt.-Col. O. A. R. Berkeley-Hill retires.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Housing Bill: Duties of Medical Officers

THE standing committee of the House of Commons on Feb. 26th agreed to Clause 10 of the Housing Bill which provides that regulations prescribing the duties to be performed by medical officers of health of boroughs and urban and rural districts, and by medical officers of health in London, made by the Minister under the Local Government Act, 1933, and the Public Health (London) Act, 1891, should include provisions for imposing on those officers a duty to furnish annually to the Minister particulars with respect to conditions in relation to overcrowding, and in particular to furnish to him particulars of any cases in which dwelling-houses, in respect of which the local authority had taken steps for the abatement of overcrowding, had again become overcrowded.

Sir F. FREMANTLE asked if the Minister of Health would arrange when the new duties were being considered that it should be the duty of the medical officer of health in a district to give a report, not only to the Minister but also to the county council. The county council, he said, had certain concurrent powers in housing and other matters which were often invaluable, not by way of penalising, but of helping the district authorities, and it was a statutory duty that the annual report of the medical officer of a district should go to the county council. He asked that these reports on housing should also go to the medical officer of the county council.

Sir HILTON YOUNG said he would consider the point raised.

HOUSE OF COMMONS

WEDNESDAY, FEB. 20TH

Marketing Scheme and Grade A (T.T.) Milk in Scotland

Captain MCEWEN asked the Secretary of State for Scotland whether the committee of investigation for Scotland had reported on the complaints by the Association of Certified and Grade A (T.T.) Milk Producers with regard to the Scottish milk-marketing scheme; if so, what were the committee's findings; and what action he proposed to take in the matter.—Sir GODFREY COLLINS replied: The committee's report has been received. They find that the provisions of the scheme relating to the contributions payable by producers of Certified milk are contrary to the interests of such producers, and are not in the public interest, and they recommend that the scheme should be amended to provide for the fixing of the contribution payable as from May 1st, 1934, in respect of Certified milk sold as such, at the rate of one halfpenny a gallon, or an equivalent rate per cow. They do not find that the provisions of the scheme are contrary to the interests of the producers of Grade A (T.T.) milk. I hope to intimate a decision on the committee's findings at an early date.

Imported Goats' Hair and Anthrax

Sir FRANCIS FREMANTLE asked the Home Secretary whether, having regard to the danger of infection with anthrax from imported goats' hair, he would take the necessary steps to ensure that all goats' hair imported into this country, including existing stocks, was thoroughly disinfected.

Mr. RHYS DAVIES asked the Home Secretary whether he would consider, with a view to the prevention of anthrax in this country, making it compulsory to disinfect all imported goats' hair at the Government station in Liverpool.—Sir J. GILMOUR replied: I have now given full consideration to all the representations submitted to me, and, after careful inquiries, I have reached the conclusion that the present arrangements for the compulsory disinfection of goat hair at the Government station should be extended to imported goat hair generally. It is proposed that the necessary order should be made at the Privy Council meeting to-morrow and take effect two months hence.

Mr. RHYS DAVIES: While thanking the right hon. gentleman for the excellent work that has been done, may I ask him to bear in mind the very large amount of goats' hair in stock already and alleged to be full of disease?

Sir J. GILMOUR: What has been proposed will only come into operation two months hence.

Consumption of Milk and Bread

Dr. SALTER asked the Minister of Agriculture the estimated quantities of milk consumed as liquid milk and bread consumed in England and Wales and Scotland respectively during the year 1934 or latest year for which figures were available.—Mr. ELLIOT replied: The total quantity of milk sold for liquid use during the year ending Sept. 30th, 1934, through the Milk Marketing Board was approximately 630,000,000 gallons. This figure does not include the considerable quantity of milk consumed in farm households or sold for liquid use by producers exempted from the milk marketing scheme. I would refer the hon. Member to the Secretary of State for Scotland as to the consumption of liquid milk in Scotland. The latest information as to the consumption of bread relates to the year 1930 when it was estimated that the total consumption of bakers' bread in Great Britain was approximately 1,650,000,000 4-lb. loaves. No separate estimate of consumption in England and Wales and Scotland respectively is available.

Scarlet Fever and Prophylactic Inoculation

Mr. GROVES asked the Minister of Health whether his attention had been called to the death of Audrey Garnett, the 18-months-old child of Henry Major Garnett, of 18, The Holt, Carr-lane, Windhill, Bradford, who died in the Bradford Children's Hospital on Jan. 18th in consequence of the administration of antitoxin as a precautionary measure against scarlet fever; whether he was aware of a similar death at Bramhope Children's Orphanage in October, 1934; and whether, in view of the facts that scarlet fever was rarely fatal, that no guarantee could be given that the inoculation would protect from scarlet fever, and that the injection might cause fatal results, he would advise local authorities that administer fever and other hospitals to cease the prophylactic inoculation of children admitted into those hospitals.—Sir HILTON YOUNG replied: The answer to the first part of the question is in the negative and the answer to the second part is in the affirmative. The death referred to in the second part occurred in August, 1934. As regards the third part, this is a matter within the discretion of local authorities acting on the advice of their medical officers, and I should not be justified in taking the course suggested by the hon. Member.

THURSDAY, FEB. 21ST

Provision of Meals at Juvenile Instruction Centres

Mr. SPENCER asked the Minister of Labour if he had considered the representations sent to him from local authorities to the effect that the work of juvenile instruction centres was impaired by the lack of provision of meals; and what, if any, powers local authorities possessed to make such provision.—Mr. OLIVER STANLEY replied: I know of only one authority—the St. Helens county borough—that has recently suggested the provision of meals at junior instruction centres. I have given the matter full consideration but I am advised that local education authorities have no power to provide meals for unemployed boys and girls attending the centres.

Mr. PALING: Was not this matter raised in one of the reports of the Commissioners in the distressed areas and in view of that cannot something be done?

Mr. STANLEY: I would remind the hon. Member that in juvenile instruction centres in England and Wales milk can be supplied free as medical treatment.

Pasteurised Milk for School-children

Sir ALFRED KNOX asked the Parliamentary Secretary to the Board of Education if he would consider the withdrawal of the recommendation to schools to use when possible pasteurised milk (para. 7 of Circular 1437 of Sept. 5th, 1934), since the County Councils' Association at Westminster, on Jan. 23rd, declared that they were not convinced that pasteurised milk was superior to raw clean milk of Grade A quality as a food for children.—Mr. HERWALD RAMSBOTHAM replied: The ground for the recommendation made by the Board in Circular 1437 is the superior safety of pasteurised milk, whereas the statement of the County Councils' Association appears to refer to the relative nutritive values of pasteurised and raw milk. On the latter point the Cattle Diseases Committee of the Economic Advisory Council expressed the opinion that, on the evidence available, any recognisable changes of quality induced in milk by pasteurisation rightly conducted are as a whole too small to outweigh the great advantage inherent in the protection from infection which the treatment secures. In view of this opinion and those expressed by the Royal College of Physicians and other bodies, my noble friend cannot see his way to withdraw the recommendation in question.

Sir A. KNOX: Will not the hon. Member allow that there is a great difference of opinion in the medical profession as to the value of pasteurisation as a protection against infection? Secondly, may I ask who is to find whether the system is carried out properly and will not my hon. friend agree that this is a severe handicap on the small producer of milk who cannot spend thousands of pounds to install plant with the result that the trade is put into the hands of big combines?

Mr. RAMSBOTHAM: The great bulk of medical opinion advocates the pasteurisation of milk and in view of that opinion it is very difficult for the Board to run counter to it.

Tenement Balconies and Health of Children

Viscountess ASTOR asked the Minister of Health whether, in view of the necessity of fresh air to the health of infants and the difficulty of securing this in the ordinary working-class flat tenement, he would impress upon local authorities the importance of providing suitable balcony accommodation in all upper-storey tenements constructed by them.—Sir HILTON YOUNG replied: Yes.

Insulin for Ex-insured Persons

Mr. GEORGE GRIFFITHS asked the Minister of Health if he would issue an order that all diabetics, members of approved societies, who had run out of medical benefits under the Health Insurance of 1932 should continue to have their insulin free, as it was a matter of life or death to them.—Sir HILTON YOUNG replied: I have no authority to issue such an order, but local authorities have power to provide insulin for persons in need of it who are unable to purchase it out of their own resources.

Housing Schemes and Mortuary Provision

Mr. BOSSOM asked the Minister of Health if he would take steps to see that in all housing developments that had not an appropriate public mortuary available in the immediate vicinity, such provision must be placed on the development itself for the use of tenants, to prevent the continuance of the present distressing conditions which sometimes were encountered.—Sir HILTON YOUNG replied: I fully appreciate the importance of the point raised by my hon. friend. Local authorities have adequate powers under the Public Health Acts to provide mortuaries, and in any case in which the circumstances required it, there is statutory power vested in the Ministry of Health, or in the case of London in the London County Council, to call upon the appropriate authority to provide a mortuary.

MONDAY, FEB. 25TH

Unemployed Persons and Health Insurance Benefits

Mr. MAINWARING asked the Minister of Health (1) how many persons throughout the country under the Health Insurance Acts were placed in the category 3 (5A), and the same information separately as it affected the counties of Glamorgan and Monmouth, and (2) what percentage of the total unemployed men and women in category 3 (5A) under the Health Insurance Acts had maintained their contributions and thus retained cash benefits.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: The number of persons in Great Britain who come within the special provisions of Section 3 (5A) of the National Health Insurance Act, 1924, as amended by the Act of 1932, is estimated at 170,000, but my right hon. friend is not able to give separate figures for particular areas. These persons are not entitled to cash benefits, but can regain title to such benefits on favourable terms by returning to employment, or by becoming voluntary contributors. Every week many persons who have fallen under the special provisions of Section 3 (5A) return to the ordinary provisions of the Acts, but no exact figures of the number of such persons are available.

Diphtheria Immunisation

Mr. GROVES asked the Minister of Health how many immunised children under 15 years of age developed diphtheria in Dewsbury in the years 1933 and 1934; how many of the cases were fatal; and what was the interval after immunisation which elapsed before the attack of diphtheria.—Sir HILTON YOUNG replied: The following is the information furnished by the local authority on this subject. The number of cases of diphtheria occurring in children under 15 years of age who had received inoculation intended to be protective against diphtheria was as follows: 1933, 26; 1934, 27. Of the 26 cases in 1933, 2 died; of the 27 cases in 1934, 5 died. All these cases were inoculated in 1932 and 1933 but were not proved to be immune by the Schick test. No children who had been proved to be immune by means of the Schick test have developed diphtheria during the period mentioned. The following Table shows the length of time which elapsed between the date of the last inoculation and the development of the disease in the cases mentioned above:—

Months	1933	1934	Months	1933	1934	Months	1933	1934
3	3	—	12	1	5	21	—	5
4	2	1	13	1	—	22	—	—
5	—	1	14	2	2	23	—	2
6	1	—	15	3	—	24	—	—
7	1	—	16	—	1	25	—	1
8	3	—	17	—	3	26	—	—
9	2	—	18	5	—	27	—	—
10	—	—	19	1	1	28	—	1
11	—	3	20	1	1			

Total .. .. (1933) 26 .... (1934) 27

Mr. GROVES asked the Minister of Health how many cases of diphtheria had occurred in Birmingham in partly or fully immunised children during the years 1932, 1933, and 1934; and what interval elapsed between the last inoculation and the attack of diphtheria.—Sir HILTON YOUNG replied: The following particulars dealing with (*a*) cases of diphtheria in completely immunised children, and (*b*) cases in children not completely immunised have been supplied by the local authority:—

TABLE A

Year.	Cases.	Length of time elapsed since complete inoculation.
1932	2	7 months; 1 year 11 months.
1933	3	2 years 8 months; 4 years 1 month; 6 years 1 month.
1934	8	1 year; 1 year 7 months; 9 months; 2 years 7 months; 3¼ years; 2¾ years; 1 year 7 months; 3 years 4 months.

TABLE B

Year.	Cases.	Length of time elapsed since inoculation.
1932	1	3 months.
1933	3	4 days; 2 years; 1 year 5 months.
1934	1	2 weeks.

Non-inflammable Films

Mr. HERBERT WILLIAMS asked the Home Secretary the reasons for proposing to apply to non-inflammable films the regulations which had been made applicable to inflammable films in the interest of protection against fire.—Sir J. GILMOUR replied: The revision of the Regulations made in 1923 under the Cinematograph Act, 1909, has been under consideration for some time past, but at

no time has it been contemplated that the same regulations should be applied to films on a nitro-cellulose base, which is highly inflammable and presents special risks, and to films on an acetate base. It is well recognised that the risks are far less in the latter case, and that these considerations must be borne in mind in the framing of any regulations.

TUESDAY, FEB. 26TH

Soldier's Illness after Local Anæsthetic

Mr. HICKS asked the Financial Secretary to the War Office if he was aware of the serious illness of Private J. W. Hutchings, Queen's Own Royal West Kent regiment, following the administration of a local anæsthetic in the course of teeth extraction; if he would state the nature of the substance injected; the number of other soldiers similarly treated; if any fatalities had occurred in consequence; and if any disciplinary action was proposed to be taken in the matter.—Mr. DOUGLAS HACKING replied: I am aware of the circumstances of this regrettable case. Owing to a grave mistake, turpentine was injected instead of the proper local anæsthetic. No other soldiers were similarly treated. Suitable disciplinary action in the matter has been taken, and special instructions have been issued designed to exclude the possibility of any similar mistake occurring in future. I am happy to say that the soldier's general health is now reported to be good.

Pensions of Indian Officials

Mr. BURNETT asked the Secretary of State for India to what services recruited by the Secretary of State the right to premature retirement on proportionate pension extended; and how many officers of these services had availed themselves of these pensions since 1919, inclusive.—Sir S. HOARE replied that eligibility to retire on proportionate pension was at present confined to members of the All-India Services, and persons holding posts, other than listed posts, borne on the cadres of those services who were appointed or selected for appointment before January 1st, 1920, and who were not permanently employed directly under the Governor-General in Council. The total number of officers also retired on proportionate pension between November, 1921, when the scheme was introduced, and the end of 1934, was 599. The All-India Services (which numbered nine) included the Indian Veterinary Service and the Indian Medical Service (Civil).

MEDICAL NEWS

University of Cambridge

Dr. Marjorie P. C. Greene and Dr. W. D. C. McCrorie have been approved for the diploma in medical radiology and electrology of the University.

University of London

The Senate, at a meeting held on Feb. 22nd, approved a proposal to hold external examinations of the University in New York. The proposal was submitted by the American Ambassador and the British Foreign Office to the State Department in New York, who have given their consent. The examinations are to be available both for British subjects and for students of other nationalities.

Royal College of Surgeons of England

On Friday, March 8th, Dr. John Beattie will give the first of three museum demonstrations on the anatomy and physiology of the cerebellum. The other two demonstrations will be given on March 15th and 22nd. On Monday, March 11th, Mr. R. Davies-Colley will show specimens illustrating disease of the testicle, and on March 18th Mr. T. B. Layton will demonstrate the nasal problems of Egyptian mummification. On March 25th Mr. R. W. Raven will deal with abnormalities of surgical importance resulting from the persistence of rudimentary embryological structures. The demonstrations will be held in the College, Lincoln's Inn-fields, London, W.C., at 5 P.M., and they are open to advanced students and medical practitioners.

Course in Psychological Medicine

The second part of the course of instruction for a diploma in psychological medicine, which has been arranged by the London County Council and is being held at the Maudsley Hospital, Denmark Hill, S.E., started this week and will continue till the beginning of June. Further information may be had from Dr. F. Golla, hon. director of the medical school at the Maudsley Hospital.

London Inter-Collegiate Scholarships Board

This board announces that an examination for 14 medical scholarships and exhibitions, of an aggregate total value of £2138, will begin on May 13th. They are tenable at University College and University College Hospital medical school, King's College and King's College Hospital medical school, the London (Royal Free Hospital) School of Medicine for Women, and the London Hospital medical college. Full particulars and entry forms may be obtained from the secretary of the board at King's College Hospital medical school, Denmark Hill, S.E. 5.

Royal Waterloo Hospital

The Duke and Duchess of Kent have both consented to be patrons of the Royal Waterloo Hospital, Waterloo-road, London. The previous Duke of Kent was one of the hospital's royal founders, and attended the inaugural meeting held in 1816.

THE report of the Joint Council of Midwifery to which we referred last week (pp. 441 and 457) has been issued in pamphlet form (price 6*d*.), and is obtainable from the National Birthday Trust Fund, 57, Lower Belgrave-street, London, S.W.1.

Medical Society of London

The 161st anniversary dinner of this society will be held at Claridge's Restaurant on Friday, March 8th, at 7.30 for 7.45 P.M., with Lord Horder, the president, in the chair.

North-West London Medical Society

The fourth annual dinner of this society will be held at the Park Lane Hotel, W., on Thursday, March 28th, at 8 P.M. Sir Harold Gillies will preside, and the secretary may be addressed at 10, Chichele-road, N.W.2.

Institute of Medical Psychology

The council of the institute has decided that all money received in response to the recent "Good Cause" appeal by Mr. S. P. B. Mais is to be spent on the immediate reduction of the waiting-list of those seeking treatment. Four more doctors with psychiatric experience are to be appointed.

Beit Memorial Fellowships

An election of junior fellows will take place in July, 1935. The fellowships are normally of the annual value of £400 and are usually tenable for three years. Some preference will be given to candidates proposing researches in mental diseases. Candidates should be prepared to begin work on Oct. 1st, and applications should be sent to Prof. T. R. Elliott, F.R.S., University College Hospital Medical School, London, W.C.1. Further particulars will be found in our advertisement columns.

Charles Mickle Fellowship

The senate of the University of Toronto have awarded the Charles Mickle fellowship for 1935 jointly to Dr. Edward Mellanby, F.R.S., and Mrs. May Mellanby. The fellowship is endowed under a bequest by the late Dr. W. J. Mickle, and is awarded annually "to that member of the medical profession who is considered by the council of the faculty of medicine of the University of Toronto to have done most during the preceding ten years to advance sound knowledge of a practical kind in medical art or science."

Chadwick Lectures

Forthcoming lectures given under the Chadwick Trust include one by Miss E. Haggis on the physical training of the population, to be given at 5.30 P.M. on March 6th at Manson House, 26, Portland-place, London, W. Sir John Orr will speak at Gateshead on March 8th on nutrition, and the Malcolm Morris lecture will be given by Mr. Henry Corsi at St. Bartholomew's Hospital on the 27th, his title being Syphilis through Four Centuries. Admission is free, and particulars may be had from the secretary of the Trust at 204, Abbey House, Westminster.

Royal Medical Benevolent Fund: Ladies' Guild

The Ladies' Guild was formed 25 years ago to supplement the work of the fund and maintenance grants of the R.M.B.F. by visiting and personal service, by providing clothes and other necessities, and by assisting in the educational and technical training of the younger beneficiaries. An entertainment is being promoted at the London Hippodrome Theatre on Friday, March 15th, in the interests of the Guild. Many well known artistes will assist at the performance which will commence at 2.30 P.M., and the Duchess of York has promised to be present. A full house is much to be desired and confidently expected The range in price of the tickets is from five shillings to three guineas, and communications should be made to the Guild of the R.M.B.F., Tavistock House, Tavistock-square, London, W.C.1.

Irish Medical Schools and Graduates' Association

The annual dinner of this association will be held at Claridge's Hotel on Saturday, March 16th, at 7.30 for 7.45 P.M. The official guests will be Lord Dufferin and Sir Richard Livingstone.

British Red Cross Society

The County of London branch of this society will shortly hold a course of seven lectures on first aid in chemical warfare, for medical men and women. Particulars may be had from the county secretary, 9, Chesham-street, London, S.W. 1.

University of Bristol

Owing to the pressure on the accommodation for the pre-clinical subjects, this university has been obliged to restrict the entry of candidates to the faculty of medicine for the session 1935–36 to those undertaking to read for Bristol degrees in medicine or dentistry or the Bristol diploma in dentistry. Those wishing to secure a vacancy for October, 1935, should make application to the registrar without delay.

Dr. Ernst Ofenheim

The sudden death is announced of Dr. Ernst Ofenheim at his home in Blackheath. The value of his work in connexion with St. John's Hospital, Lewisham, has long been known to the medical profession but his extraordinary personal generosity was kept entirely secret. The money which he spent in charitable directions and in securing possession of the area around the hospital must have been very large, as, in addition to bearing the cost of acquiring the freeholds, he compensated the evacuated tenants.

Manchester Royal Infirmary

The annual meeting of the trustees of the Manchester Royal Infirmary was held on Friday, Feb. 8th, in the Town Hall, Manchester, the Lord Mayor of Manchester, Alderman S. Woollam, presiding. A report and statement of accounts were presented and their adoption carried on the proposal of the Lord Mayor, seconded by Mr. Walter Cobbett, chairman of the board of management of the institution.

The report proved an interesting document. In evidence of the mass of work carried on we have imposing figures. Thus a total of over 13,000 in-patients were admitted, 11,890 being to the Infirmary itself and the remainder to the Barnes Convalescent Hospital, and to this number that of the out-patients during the year bore a normal relation, over 50,000 having been seen, just short of 20,000 being new patients, the balance being accounted for by accidents and casualties. The X ray and electro-cardiograph departments, the massage departments, and the clinical laboratory were responsible for a great volume of work. The increase in the number of patients treated or examined in the X ray department is largely accounted for by the formation of orthopædic and neuro-surgical departments which from the nature of their work frequently require radiological investigation of patients "Whilst the actual treatment of all patients by the best technique," says the report, "must always remain the main function of the Royal Infirmary, it is evident that further progress can be obtained only by ceaseless investigation and teaching," and the activities of the Infirmary have coincided with the sentiment. Feeling that if medical teaching was not to become too academic and be divorced from actual conditions of practice, the University has purchased the former radium institute and equipped it as a students' hostel.[1] Students will in future spend three months of their final year of training in this hostel, thus gaining personal contact with all the forms of work, urgent or routine, which go on within the walls of the Infirmary during the whole day. This period of practical work under the eyes of superiors should, in the words of the report, "recapture some of the good points of the old apprenticeship system." In the department of clinical investigation progress was made during the work with the researches into the causes and treatments of the anæmias and leukæmias, Addison's disease, and diseases of the stomach and intestines. The department possesses 17 research workers almost all of them voluntary, and while increase in equipment and personnel has kept pace more or less with urgent work, much remains to be done, as the report recognises, in the face of fatal diseases still awaiting investigation. The income and expenditure account shows an adverse balance, but the clear and detailed manner in which the items are set out make it obvious that there are substantial increases in certain directions, while on the expenditure side high prices have to be taken into account.

Mr. Cobbett, in presenting the report, referred to the discussion now proceeding widely on the question of manipulative surgery, and pointed to the orthopædic department of the hospital, which though quite young, had already become a very busy out-patient department, patients both children and adults being drawn from a very wide area. He alluded also to the volume of work being done in the research laboratory of the hospital, and reminded his hearers that the laboratory had been described by the late Walter Fletcher as one of the best equipped in the country; the increase in work, Mr. Cobbett said, was reflected in the request now being made to the board of management for the construction of further accommodation. He closed with a tribute to the untiring but successful labours of Mr. W. R. Tindale, the secretary of the hospital.

On Thursday, Feb. 22nd, Lord Derby, president of the Infirmary, opened a new dietetic department given by the Skelton Bounty, and received some new apparatus for the X ray department, towards which Mr. Robert McDougall had contributed £3000.

An Admission Hospital in Yorkshire

Feb. 13th saw the opening of a new admission hospital at the South Yorkshire Mental Hospital, Wadsley, which is one of the four institutions controlled by the West Riding of Yorkshire Mental Hospitals Board. Sir John Quarmby, as chairman of the Board, performed the ceremony, and recalled that the Wadsley Hospital was established 63 years ago to accommodate 300 patients. To-day there were over 2000. Delay in treatment had meant the building of permanent homes for many people who might have been brought back to health, but those admitted to the new admission unit (which will be called the Middlewood Hospital) with hopes of success would never go to the main institution. Lieut.-Colonel W. J. N. Vincent, who was medical superintendent from 1911 to 1933, described the new building as the greatest advance that had yet been made at Wadsley for the benefit of the patients. It gave the medical and nursing staff a chance of paying special attention and care to those newly admitted, and would facilitate their classification. Furthermore, the management of voluntary and temporary cases would be much easier. Situated near Sheffield with its large general hospitals and progressive university, Wadsley was in a strong position for research in psychiatry, and Dr. Vincent spoke of the possibility that with the other institutions of the Board it might form part of a West Riding psychiatrical centre second to none. Dr. Arthur Pool, the present medical superintendent, appealed to the public to disabuse their minds once and for all of the old idea of the lunatic segregated in an asylum. They must think of the mental hospital as a modern hospital where bodily comfort is cared for and peace of mind is the constant aim of the staff. Dr. Pool paid an especial tribute to the mental nurse of to-day. The remarkable advance in mental nursing he attributed

[1] A description of the hostel was given in THE LANCET, 1934, ii., 1126.

to the acceptance and spread of the examination system, and the progressive work of the Mental Hospital and Institutional Workers' Union. He looked forward to the day when the contact between general medicine and psychiatry would be still more intimate—when mental hygiene would be as much a part of the general public health system as was the study of tuberculosis and infectious disease.

The new hospital, a detached self-contained unit, will accommodate 100 patients, and includes treatment rooms for hydrotherapy. There are two villas for the semi-convalescent and the total cost is not likely to be more than £48,500.

ERRATUM.—A mistake occurred in our issue of Feb. 16th in the announcement of the dates on which the International Congress of the History of Medicine will be held in Madrid. The Congress will be held from Sept. 23rd to Sept. 29th.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, March 5th.
Pathology. 8 P.M. for 8.30 P.M., Laboratory Meeting at Guy's Hospital, S.E. C. K. Simpson: 1. Relationship between the Histological Forms of Gastritis and the Secretory Activity of the Stomach. G. W. Nicholson: 2. Teratomata. S. de Navasquez: 3. Twelve Cases of Bilateral Cortical Necrosis in Pregnancy. 4. Dioxan Poisoning. 5. Myelolipoma of Suprarenal Gland. A. A. Osman: 6. Sections of Kidneys from Three Cases originally described by Dr. Bright. C. Dukes: 7. Polyposis Intestini. 8. Chronic Ulcerative Colitis. L. W. Cann: 9. Double Zone Hæmolysis with Staphylococci.
Orthopædics. 8.30 P.M. Mr. H. Osmond Clarke, Mr. A. T. Fripp, and Mr. T. T. Stamm: Fractures of the Tibia involving the Knee-joint.
WEDNESDAY.
Surgery. 8.30 P.M., Prof. Grey Turner, Dr. Arthur Hurst, and Mr. J. Paterson Ross: The Training of a Surgeon.
THURSDAY.
Tropical Diseases and Parasitology. 8.15 P.M., Mr. A. H. McIndoe: Some Experiments in the Surgery of Lymphœdema. Members of the Section of Surgery are invited.
FRIDAY.
Ophthalmology. 3 P.M., Clinical Meeting at the Nottingham and Midland Eye Infirmary.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY, March 4th.—9 P.M., Mr. J. E. H. Roberts: Surgery of Pleural and Pulmonary Infections. (Last Lettsomian lecture.)

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY, March 8th.—8.45 P.M. (Miller General Hospital, Greenwich, S.E.), Mr. A. Lawrence Abel: Common Diseases of the Rectum and Anal Canal.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
FRIDAY, March 8th.—5 P.M., Dr. John Beattie: The Anatomy and Physiology of the Cerebellum.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.
TUESDAY, March 5th.—5 P.M., Dr. E. H. R. Harries: Infection and its Control in Children's Wards. (Last Milroy lecture.)
THURSDAY.—5 P.M., Dr. A. A. Moncrieff: Respiratory Failure, including so-called Asphyxia Neonatorum. (First Goulstonian lecture.)

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, March 4th.—10 A.M., medical wards, skin clinic. Noon, surgical pathology. 2 P.M., surgical and gynæcological wards, eye and gynæcological clinics. 4.15 P.M., Mr. Green-Armytage: Genius and Disease.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., throat clinic.
WEDNESDAY.—10 A.M., medical and children's wards, children's clinic. 2 P.M., eye clinic.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., eye and genito-urinary clinics. 4.15 P.M., Dr. Burnford: Some Febrile States.
FRIDAY.—10 A.M., skin clinic. Noon, lecture on treatment. 2 P.M., throat clinic. 4.15 P.M., Dr. Gordon: Skin Infections of the Hand.
SATURDAY.—10 A.M., medical wards, children's and surgical clinics.
Daily at 2 P.M., operations, medical and surgical clinics. The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, March 4th, to SATURDAY, March 9th.—PRINCE OF WALES'S HOSPITAL, Tottenham, N. All-day course in medicine, surgery, and the specialties.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues., 8 P.M., Mr. Hamilton Bailey: Mouth, Jaws, and Neck. Thurs., 8 P.M., Mr. T. Meyrick Thomas: Breast.—ROYAL ALBERT DOCK HOSPITAL, E. Week-end course in clinical surgery.—LONDON HOSPITAL, E. Sat., 3 P.M., Dr. K. H. Tallerman: Demonstration of Children's Diseases.—WELLCOME MUSEUM OF MEDICAL SCIENCE, Euston-road, N.W. Thurs., 3 P.M., Mr. Percival P. Cole: Tumours of the Bone.—BROMPTON HOSPITAL, S.W. Course in Surgery of the Chest. Tues., Wednes., Thurs., and Frid., 5 P.M., Course in Diseases of the Chest.—Courses and clinics arranged by the Fellowship are open only to members and associates.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, March 4th.—3.30 P.M., Dr. Hinds Howell: Poliomyelitis.
TUESDAY.—3.30 P.M., Dr. Critchley: Cerebral Vascular Disease.
WEDNESDAY.—3.30 P.M., Dr. Kinnier Wilson: Clinical Demonstration.
THURSDAY.—3.30 P.M., Dr. Critchley: Cerebral Vascular Disease.
FRIDAY.—3.30 P.M., Dr. Carmichael: Deficiency Diseases of the Nervous System.
Out-patient clinics daily at 2 P.M.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
MONDAY, March 4th.—Noon, Dr. W. Payne: Endocrine Disorders.
WEDNESDAY.—2 P.M., Dr. J. H. Thursfield: To Review Splenectomy in Children.
THURSDAY.—Noon, Dr. A. Signy: The Examination of the Blood.
FRIDAY.—Noon, Dr. W. P. H. Sheldon: Artificial Feeding of Infants.
Out-patient clinics daily at 10 A.M. and ward visits (except on Wednesday) at 2 P.M.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY, March 6th.—4 P.M., Dr. Rickword Lane: The Diabetic.

CANCER HOSPITAL (FREE), Fulham-road, S.W.
THURSDAY, March 7th.—Dr. T. B. Vaile: Anæsthetic Problems in the Surgery of Malignant Disease.

LONDON HOMŒOPATHIC HOSPITAL, Great Ormond-street, W.C.
THURSDAY, March 7th.—5 P.M., Dr. Margery Blackie: Rheumatoid Arthritis.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, March 8th.—4 P.M., Mr. Harold Kisch: Frontal Sinusitis: Diagnosis and Treatment.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.
THURSDAY, March 7th.—9 P.M., Mr. John Everidge: The Care of the Prostatic Patient.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, March 6th.—4 P.M. (St. James' Hospital, Ouseley-road, Balham, S.W.), Major M. Sinclair: Demonstration of Fracture Cases.

GENERAL INFIRMARY, Leeds.
TUESDAY, March 5th.—3.30 P.M., Mr. Armitage: Demonstration of Surgical Cases (including Toxic Goitre and Intracranial Tumours).

PUBLIC DISPENSARY AND HOSPITAL, Leeds.
WEDNESDAY, March 6th.—4 P.M., Mr. A. D. Sharp: Tonsils and Adenoids: Treatment.

ROYAL INFIRMARY, Manchester.
TUESDAY, March 5th.—4.15 P.M., Dr. A. H. Holmes: Unresolved Pneumonia.
FRIDAY.—4.15 P.M., Dr. A. Ramsbottom: Demonstration of Medical Cases.

ANCOATS HOSPITAL, Manchester.
THURSDAY, March 7th.—4.15 P.M., Mr. F. H. Diggle: Minor Surgery in Ear, Nose, and Throat Practice.

GENERAL HOSPITAL, Newcastle-on-Tyne.
SUNDAY, March 3rd.—10.30 A.M., Mr. A. Logan: Lecture.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, March 6th.—4.15 P.M. (Western Infirmary), Mr. W. A. Campbell: Surgical Cases.

Appointments

BEAVER, R. ATWOOD, B.M. Oxon., has been appointed Anæsthetist to the Dreadnought Hospital, Greenwich.

GOLDING, F. CAMPBELL, M.B. Sydney, M.R.C.P. Lond., D.M.R.E., Hon. Radiologist to the Royal National Orthopædic Hospital, London.

LUCAS, H. A., B.A. Camb., M.R.C.S. Eng., Pathologist to the Central London Throat, Nose, and Ear Hospital.

LYLE, T. KEITH, M.Chir. Camb., M.R.C.P. Lond., F.R.C.S. Eng., Ophthalmic Surgeon to the Metropolitan Hospital.

Certifying Surgeons under the Factory and Workshop Acts: Dr. R. M. BARROW (Stone, Staffs.) and Dr. A. J. PARTRIDGE (Ebbw Vale, Monmouth).

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Marlow, Bucks.

Vacancies

For further information refer to the advertisement columns

Auckland, New Zealand, General Hospital.—Radiologist. £850.
Beit Memorial Fellowships for Medical Research.—Jun. Fellows. Each £400.
Birkenhead General Hospital.—Res. Cas. O. £100.
Birmingham, Little Bromwich Hospital for Infectious Diseases.—Jun. Asst. M.O. £300.
Bournemouth, Royal National Sanatorium for Consumption, &c.—Asst. Res. M.O. £200.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Bristol Eye Hospital.—Jun. Res. H.S. At rate of £100.
Bristol Royal Infirmary.—H.P. At rate of £80.
Cambridge, Addenbrooke's Hospital.—H.S. At rate of £130.
Cardiff, King Edward VII. Welsh National Memorial Association. H.P. for Adeline Patti Hospital, Craig-y-nos. At rate of £150.
Cardiff, Welsh National School of Medicine,—Jun. Asst. in Surgical Unit. £450.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Registrar. £150.
Cheltenham General and Eye Hospitals.—H.S. £300.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—Clin. Asst. to the Laryngologist.
Dreadnought Hospital, Greenwich, S.E.—H.P. and H.S. Each at rate of £110.
Durham County Council, Education Dept.—Asst. School M.O. £500.
East Ham Memorial Hospital, Shrewsbury-road, E.—Pathologist (Half-time). £300–£350. Also H.S. to Spec. Depts. and Cas. O. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.
Fulham Hospital, St. Dunstan's-road, Hammersmith, W.—Asst. M.O. £350.
Gloucester Royal Infirmary, &c.—H.S. At rate of £150.
Golden Square Throat, Nose and Ear Hospital, W.—H.S. £100.
Great Yarmouth General Hospital.—H.S. £140.
Guernsey, States of.—M.O.H. and Part Medical Officer, £800—£1000.
Halifax Royal Infirmary.—Third H.S. £150.
Hampstead General and North West London Hospital, Haverstock-hill, N.W.—Cas. M.O. for Out-patient Dept. At rate of £100.
Harrogate and District General Hospital.—H.P. and Cas. O. Each at rate of £150.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—Physician.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Med. Reg. At rate of £100.
Hospital for Sick Children, Great Ormond-street, W.C.—H.P. and H.S. Each at rate of £100. Surgeon. Also Physician to Out-Patients.
Huddersfield Royal Infirmary.—Cas. O. £200.
Hull City Hospital.—Res. M.O. £350.
Hull Royal Infirmary.—H.S. to Ophth. and Ear, Nose, and Throat Dept. Also Cas. O. Each at rate of £150.
Ilford, King George Hospital.—Hon. Dermatologist.
Kent Education Committee, School Medical Service.—Dental Surgeon. £500.
Leicester Royal Infirmary.—Res. H.S.'s, H.P.'s, Cas. O. Also Jun. Res. Anæsthetists. Each £125. Also Jun. Cas. O. £100.
Leigh Infirmary, Lancs.—Jun. H.S. At rate of £150.
Liverpool and District Hospital for Diseases of the Heart.—H.P. At rate of £100.
Liverpool Royal Children's Hospital.—Res. Surg. O. for Heswall Branch. At rate of £120.
Liverpool University.—Lecturer in Dept. of Pathology. £600.
Liverpool, Women's Hospital.—H.S. At rate of £100.
L.C.C.—Three Asst. M.O.'s. Each £600.
London Jewish Hospital, Stepney Green, E.—Hon. Second Radiologist.
Manchester, Ancoats Hospital.—Two H.S.'s. Each at rate of £100.
Manchester Hospital for Consumption, &c.—Asst. M.O. for Crossley Sanatorium. £200.
Manchester Northern Hospital.—Hon. Asst. Gynæcological Surgeon.
Manchester, Royal Children's Hospital.—Two Asst. M.O.'s. Each at rate of £150.
Manchester Royal Infirmary.—Hon. Asst. Physician.
Manchester, St. Mary's Hospitals.—Two H.S.'s, for Whitworth St. West Hospital. Also two for Whitworth Park Hospital. Each at rate of £50.
Margate and District General Hospital.—Res. M.O. £150.
Marie Curie Hospital 2, Fitzjohn's-avenue, N.W.—Res. M.O. At rate of £100.
Maudsley Hospital, Denmark Hill, S.E.—Asst. M.O. At rate of £300.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Sen. and Jun. Res. M.O.'s. At rate of £140 and £100 respectively.
Mitcham, Wilson Hospital.—Res. M.O. At rate of £120.
National Hospital, Queen-square.—Asst. Physician.
Newark General Hospital.—Res. H.S. £175.
Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £120.
Oldham, Boundary Park Municipal Hospital.—Med. Supt. £1000.
Princess Beatrice Hospital, Richmond-road, Earl's Court, S.W.—H.S. and Cas. O. Each at the rate of £110.
Retford, Notts, Rampton State Institution for Mental Defectives.—Fifth M.O. £510.
Royal Eye Hospital, St. George's-circus, S.E.—H.S. and Asst. H.S. At rate of £150 and £100 respectively. Part-time Pathologist. £100. Hospital Refractionist. £50. Also Clin. Assts.
Royal National Orthopædic Hospital. Great Portland-street, W.—Two H.S.'s. Each at rate of £150.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Hon. Clin. Asst.
St. Bartholomew's Hospital, E.C.—Chief Asst. to X Ray Diagnostic Dept.
St. Charles' Hospital, St. Charles-square, Ladbroke-grove, W.—Asst. M.O. £350.
St. Giles' Hospital, Brunswick-square, Camberwell, S.E.—Asst. M.O. £350.
St. Peter's Hospital for Stone, &c., Henrietta-street, W.C.—H.S. At rate of £75.
St. Thomas's Hospital, S.E.—Chief Asst. to Ear, Nose, and Throat Dept.
Salford Royal Hospital.—H.P., Two H.S.'s., and Cas. H.S. Each at rate of £125.
Sheffield, Jessop Hospital for Women.—Res. M.O. At rate of £150.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Swindon and North Wilts Victoria Hospital.—Res. M.O. £125.
Tilbury Hospital, Essex.—H.S. At rate of £140.
Ventnor, I. of W., Royal National Hospital for Consumption, &c.—Jun. Asst. Res. M. O. At rate of £300.
Wadsley Mental Hospital, near Sheffield.—Sixth Asst. M.O. £350.
Warrington Infirmary and Dispensary.—Third Res. At rate of £150.
Watford and District Peace Memorial Hospital.—H.S. At rate of £150.
West London Hospital, Hammersmith-road, W.—H.P., H.S., and H.S. to Throat, Nose, and Ear Dept. Each at rate of £100. Cas. O. £250. Also Hon. S.
Westminster Hospital Annexe, 66, Fitzjohns-avenue, Hampstead.—Res. M.O. £200.
Windsor, King Edward VII. Hospital.—H.S. At rate of £100.
Wrexham and East War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.

Medical Referee under the Workmen's Compensation Act, 1925, for the Dewsbury and Leeds County Court Districts (Circuit No. 14). Applications should be addressed, The Private Secretary, Home Office, Whitehall, London, S.W.1, before March 16th.

Births, Marriages, and Deaths

BIRTHS

AYNSLEY.—On Feb. 12th, the wife of Thomas R. Aynsley, M.B. Durh., of Leyton Mount, Bournemouth, of a daughter.
COOKE.—On Feb. 18th, at Oxford, the wife of Alexander Cooke, D.M. Oxon., M.R.C.S. Eng., of a son.
HOBDAY.—On Feb. 13th, at Trebovir-road, Earl's Court, the wife of F. T. J. Hobday, B.Chir. Camb., M.R.C.S. Eng., of a son.
INNES.—On Feb. 22nd, at a nursing-home in Plymouth, the wife of L. Walrond Innes, M.B., F.R.C.S. Edin., of a daughter.
KIDD.—On Feb. 11th, at Newcastle-on-Tyne, the wife of Edwin Kidd, M.B., B.S. Durh., of Washington, Co. Durham, of a daughter.
LESLIE.—On Feb. 11th, at Hyde Park Mansions, London, N.W., the wife of Francis Leslie, M.R.C.S. Eng., of Chichester, of a daughter.
MOORE.—On Feb. 17th, at a nursing-home, the wife of G. Moore, M.C., M.B. Camb., of Maidenhead, of a daughter.
NICHOLSON.—On Feb. 9th, at Tiverton, the wife of G. Nicholson, M.D. Edin., of a daughter.
NICOL.—On Feb. 23rd, the wife of A. Corskie Nicol, M.B. Aberd., Killieser-avenue, London, S.W., of a daughter.
NORTHFIELD.—On Feb. 16th, at Welbeck-street, W., the wife of D. W. C. Northfield, M.S. Lond., F.R.C.S. Eng., of a son.
RILEY.—On Feb. 11th, at Broadstairs, the wife of Ronald Riley, M.R.C.S. Eng., of a son.
STILWELL.—On Feb. 13th, at Beckenham, the wife of G. D. Stilwell, M.R.C.S. Eng., of a daughter.

MARRIAGES

MAYNE—PAGE.—On Dec. 20th, 1934, at the Cathedral, Khartoum, Finlay S. Mayne, M.B., B.Ch., B.A.O. Belf., F.R.C.S. Edin., of Belfast and Sudan Medical Service, to Viva, second daughter of the late C. A. Page and Mrs. L. M. Page, of Sleaford, Lincs.

DEATHS

BOYD.—On Feb. 18th, suddenly, at a nursing-home, Windsor, Lt.-Col. John Francis Boyd, M.R.C.S. Eng., I.M.S., aged 53.
COLQUHOUN.—On Feb. 17th, at Dunedin, Daniel Colquhoun, D.S.O., M.D., F.R.C.P. Lond., Emeritus Professor of Medicine, University of Otago, New Zealand.
EYNON.—On Feb. 23rd, Charles Merlin Eynon, of Latchford House, Warrington, M.D., Q.V. Ontario, F.R.C.S. Edin., aged 35.
FARR.—On Feb. 23rd, suddenly, Ernest Augustus Farr, M.R.C.S. Eng., J.P., of Andover.
HUGHES.—On Feb. 20th, suddenly, at Macclesfield, John Brierley Hughes, M.B.E., M.B. Camb.
NEAL.—On Feb. 24th, suddenly, at Heath Close, N.W., James Neal, M.R.C.S. Eng., in his 69th year.
OFENHEIM.—On Feb. 23rd, at Blackheath, S.E., Ernst Ofenheim, M.D. Leipzig, M.R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

HOUSE DISEASES IN THE TROPICS*

By D. B. BLACKLOCK, M.D. Edin.
PROFESSOR OF TROPICAL HYGIENE, UNIVERSITY OF LIVERPOOL

THE fact is sometimes forgotten that the problems of hygiene in the tropics are predominantly those of rural sanitation. The peasant farmers and the village populations are on the whole quite illiterate, and for this reason health propaganda based on health literature cannot reach the masses. The establishment of broadcasting centres would in part remedy this fundamental drawback of illiteracy. Example being better than precept, the building, in as many districts as possible, of hygienic houses and villages as standard models should be hastened; although a necessary part of any educational policy of hygiene, this cannot be left to the initiative of ignorant and backward populations. The report of the Simon Commission laid stress on the illiteracy and the low standard of life of the Indian peasant in relation to public health. As long ago as 1870 D. Boyes Smith, then sanitary commissioner of Bengal, wrote †: "The people live in villages which appal the sanitarian. Every revolting abomination conceivable is to be met with in these villages—obstructed ventilation, corrupted ground, polluted atmosphere, putrid organic matters, fæcal gases, the revolting water tank, with consequent sickliness, debility, degeneration and cachexia of the people." Since then a succession of observers, more especially members of the Indian Medical Service, have drawn attention to the inadequacy of the means available for improving these conditions.

The diseases which could be avoided by proper selection of site and of material for construction are now known to be so numerous and important that it may serve a useful purpose to collect and summarise the available information.

Malaria Houses

In a recent review on housing and malaria for the League of Nations, Clayton Lane (1931) wrote of those malarious houses where inhabitant after inhabitant acquires malaria: "These houses have certain characteristics, at least in Europe; they possess dark, dirty, and often damp portions. . . . These various lines of investigation," he wrote, "press with cumulative force the conclusion that the house is a factor of primary importance in the acquisition and spread of malaria." On the other hand, Watson (1925) observed that it was among ". . . the best and the best managed" estates in Assam that malaria was most prevalent, and that in Kuala Lumpur in the Federated Malay States malaria was originally worse among the best houses and the best-educated people. The malaria mosquitoes breed in collections of water almost invariably outside and at varying distances from the house, so that the degree of convenience for the adult mosquito to enter the house from these breeding places will clearly be a factor of importance. Watson explained that the high prevalence of malaria in well-constructed houses was not the result of neglect of sanitation or any other general measures, but was due to the nature of the land favouring the breeding of certain species of *Anopheles* near these houses. Christophers and Missiroli (1933) have discussed many aspects of the relation of housing to malaria in a report to the League of Nations.

We can go very far back for examples of malaria houses; they were well recognised for instance by the Italians during the last century. One of the first things which Manson (1900) did when he was about to put Ross's discovery to the test in the field was to look for an intensely malarious district in which to set up an experimental house. Sambon found for the purpose a fever-haunted spot on the King of Italy's hunting ground near Ostia. The permanent inhabitants of this region all suffered from malarial cachexia, and the field labourers who came from healthy parts of Italy to reap the harvest after a short time contracted fever; in other words, the houses of that area were all malaria houses, in which one inhabitant after another contracted malaria. Now the only protection against mosquito bite and fever employed by those who occupied Manson's experimental hut was mosquito netting, wire screens in doors and windows, and—by way of extra precaution—mosquito nets around their beds; they went about the country quite freely, but were careful to be indoors from sunset to sunrise. Drs. Sambon and Low, Signor Terzi and their two Italian servants occupied the hut from July to September and enjoyed perfect health, in marked contrast to their neighbours who were all of them either ill with fever or had suffered malarial attacks. This experiment settled the broad essential difference between a malaria house and a non-malaria house in a highly malarious region: the malaria house admits the anopheline vector and the non-malaria house does not.

A variable degree of freedom from the disease in less malarious countries can be obtained by adopting other measures which are capable of producing the same result—that is, exclusion from the house of the anopheline vectors. Destroying the efficiency of breeding places up to a distance sufficiently remote from the house, or selecting a site far enough away from indestructible breeding places, are two such measures. Prevention of anopheline entry from outside is thus the main consideration for the solution of the malaria-house problem in almost all places where the vector is now known.

There are, however, exceptional cases which merit attention. Bentley (1909) in Bombay showed that *Anopheles stephensi* breed in wells and often in large and small tanks. The introduction of a piped water-supply had one remarkable result: it increased the anopheline distribution, owing to water being left exposed in supply cisterns to water-closets, baths, and wash basins, so that mosquitoes could gain access to it. *A. stephensi* then bred freely actually inside houses. The remedy for this house-breeding habit is to avoid the keeping of exposed water in the house. The mosquitoes can then breed only outside the house and the usual methods of exclusion become applicable.

The malaria house therefore owes its origin to one or other of several defects: in its structure, if it is of such shape or material that it cannot be screened successfully; in its site, if it is situated within flight range of the breeding places of malaria vectors; and in this occasional feature that, if the inhabitants allow water to be exposed in the house, certain anophelines may breed in it.

Blackwater-fever Houses

This term has been employed for many years. Strickland and Chowdhury (1930), for example, wrote of one place, ". . . the fact that malaria and blackwater were more prevalent in the upper part of the valley, 16 blackwater houses as against 3 in the lower, while the man-made breeding places of *Anopheles culicifacies* were much more extensive in the upper parts, suggests a *culicifacies* connexion with blackwater." Thomson (1924), in his monograph on blackwater fever in Rhodesia, pointed out as a striking fact that Europeans living in the larger townships, which are well engineered, were protected from blackwater fever. He noted, on the other hand, that some houses in rural areas had been abandoned altogether because of the number of cases and deaths from this disease occurring in them, and he observed that blackwater fever occurred in

* A Chadwick lecture (abridged) delivered at Manson House on Oct. 25th, 1934.

† See Indian Med. Gaz., 1911, xlvi., 350.

those houses where precautions against mosquitoes are disregarded.

The blackwater-fever house, so far as our knowledge goes, is merely a special instance of the malaria house, occurring in areas where the malignant tertian parasite of malaria is prevalent.

Yellow-fever Houses

Boyce (1909) remarked that it had been noted over and over again how yellow fever clung to certain places and houses; in Belize, Honduras, cases of yellow fever occurred amongst the best-cared-for class of people living in the best residential houses where the sanitary arrangements were excellent. The proof that yellow fever was carried from man to man by the mosquito, *Aedes argenteus* (*Stegomyia fasciata*), furnished the explanation of the known distribution of the disease. This mosquito breeds by preference in water containers close to and in houses. It was therefore no mere chance that the disease tended to cling to a house once it appeared there; nor that it should be most prevalent in places where the water-supply was not pipe-borne but had to be conserved in numerous vessels of all kinds kept in the house and yard.

In the case of yellow fever however we observe a profound difference in house-relation as compared with that which is the rule in malaria and blackwater fever. It is neither the structure nor the site of the house which assumes the greatest importance, but the habit of keeping near or inside the house numbers of vessels containing water in which aedes may breed —a habit forced upon the inhabitants by the absence of a proper piped supply. No excellence of construction, no selection of material, no screening, and no choice of site will be of any avail to preserve the inmates from the risk of yellow fever should an infective case be introduced into their midst while aedes is breeding in the house.

Relapsing-fever Houses

The proof afforded by Ross and Milne (1904) in Uganda and by Dutton and Todd (1905) in the Congo that this disease was transmitted in those regions by ticks gave the clue to the meaning of the term relapsing-fever house which was very familiar to the natives. Dutton and Todd wrote: "... in infected houses the ticks are found in the dust and cracks of mud floors, particularly in dry places near the hearth, in bed-platforms, or immediately inside the door-sill, just where the natives are accustomed to sit down. They may hide themselves in the cracks and crevices of mud or grass walls or even in the thatched roofs." These writers record how Livingstone associated the presence of ticks in a house with Arab residence, and they confirmed his observation. The explanation given is worthy of remark, as showing how unexpected results may sometimes arise from an improved but not sufficiently improved method of house construction. Dutton and Todd suggest that one of the reasons of the more frequent association of these ticks with Arab than with native houses is that the Arab makes better drier buildings and lives in permanent villages; whereas native huts are temporary affairs, and one or two cases of sickness will often be enough to make the community leave their houses and build a village elsewhere. This at first sight unexpected connexion between somewhat better buildings and definitely worse house infections is repeated in relation to plague.

Relapsing fever due to ticks is then directly related to the materials used for the house. The tick vectors find their hiding places within cracks in the friable dry mud of the floor and walls, and the thicker and more substantial these are, provided they are made of this kind of material, the better for the ticks, and the worse for the inhabitants. The site, and the special habits of the inmates as to water-supply, food, and other things, have, relatively speaking, no significance in the production of tick relapsing-fever houses. There is another type of relapsing fever which is transmitted not by ticks but by lice. In louse-borne fever it is the personal hygiene of the inhabitants which is of paramount importance, especially where the houses are overcrowded.

Plague Houses

Manson-Bahr states that the most potent circumstances which predispose to the epidemic outbreak of plague are extreme filth and overcrowding, and that with alteration in the habits and circumstances of the population the disease, after having become epidemic, may die out spontaneously. Taylor (1919) says it is well recognised that housing conditions which favour rat infestation form the most important factor in the occurrence of plague, and that the habits of the occupants with regard to providing shelter and food for rats, in dwelling places which would otherwise be free from these rodents, may result in the presence of a considerable rat population with its attendant risk of the spread of plague.

Instructive observations were made by Cook (1914) in Bihar and Orissa; he put on record his opinion that the building of mud huts constitutes a grave danger to the community, by reason that they afford a suitable harbourage for rats. Of peculiar interest is his proposal that if people who are going to build houses cannot afford a pucca house—that is, one made of lasting materials—they should be compelled to erect only a wattle hut and to smear this with a *thin* layer of mud to prevent fire; in such walls rats cannot lodge. The weight of the roof in this case has to be borne on special poles, the walls being too thin to support it. Chuckerbutty (1913), in discussing the subject of rat-drives, alluded to the structure of many of the houses in Burma. These have low plank floors, and it is not possible to destroy the rats which exist under these floors without removing the planks. This, he says, has led to the use of raised floors or to pucca rat-proof floors.

In the Sixth Report on Plague (1912) it is affirmed that "the Bengali, whether intuitively or otherwise, seems to have adopted a method of house construction which succeeds in practically eliminating rats from his house, be the house pucca or kutcha."

"The pucca houses, being well built of stone or brick and mortar, often with concrete roof, from the very nature of the materials used in their construction afford little harbourage for rats. These animals may, however, effect an entrance from outside either through the floor or by the door. Many Bengali houses have been so constructed as to prevent rats gaining an entrance in these ways, being built on raised plinths of special construction. These plinths are erected with a brick or masonry facing, along the upper border of which runs a bead of varying depth which projects for from 4 to 6 inches or more over the base. The floor is made of a layer of concrete faced with hard polished cement, below which is a layer a foot or more deep of dry sand. These devices are said to have been adopted for a number of reasons: (1) to keep the floors dry, a very necessary precaution in a country subject to floods; (2) to prevent white ants from entering the houses; (3) to prevent the access of rats, which cannot make their burrows in the sand or climb over the overhanging plinth. Of course, not all the native houses are built in this way, but nearly all the new government buildings at Dacca are constructed on this plan.

"The walls of mud houses in most parts of India are made of such a thickness that rats find ample room to make their burrows in them. Living in this situation the rats not only find a warm and sheltered home but are in close proximity to their food-supply, which is always abundantly found within and around the untidy Indian dwelling. It will thus be seen that in Eastern Bengal and Assam it is difficult to decide whether pucca or kutcha houses afford the more shelter for rats; it is evident, at all events, that the structure of the house here in conjunction with the habits of the people conduce to the comparative scarcity of rats in their dwellings and are the main reasons for the freedom of the province from plague."

As evidence of a popular realisation of cause and effect, Harriss (1911) pointed out that in some

districts in Burma the people themselves, if rats are reported to be dying, tear down their thatched roofs and destroy all rats they can catch. He made the depressing statement, however, that the construction of rat-proof houses for the Burmese was seen to be impossible, apparently owing to the apathy of the people.

In a memorandum by the Sanitary Commissioner with the Government of India (1911) it was remarked that the rat is not a domestic animal in the houses of Europeans, but it is a domestic animal in the houses of large numbers of Indians; the writer asked for education of the Indian up to the point of getting rid of rats by not leaving food residues about the house. Lukis (1911) stated that the question of prevention of plague was not one of expenditure, but of domestic hygiene, and repeated that it was necessary to educate the natives of India in this subject. Kunhardt (1919) made an estimate of the probable rat population of India, and felt justified in concluding from the statistics and facts available to him that the number of house rats (*Mus rattus*) was at least one and a half times as great as the human population; he calculated, in addition, one field rat for every human being, giving a total rat population for India of 800 millions. He stated that fully 10 million deaths from plague had occurred in the course of the previous 20 years.

All this goes to show that in plague prevention both the method of construction and the materials of the house are of outstanding significance; bamboo, for instance, is especially apt to harbour rats. We find here again the apparent anomaly that a house which seems somewhat better built may be, from the plague aspect, worse for the inhabitants than a poorer type of house. The site has no great influence, but the habits of the tenants are important; the danger lies in leaving foodstuffs of any kind in parts of the house accessible to rats.

Typhus Houses

In 1862 Tweedie wrote that typhus often prevails epidemically from unknown cases, besides being the almost invariable accompaniment of famine and destitution, spreading rapidly in overcrowded and ill-ventilated dwellings; and when once engendered, from whatever cause, it is propagated by contagion, regardless of age, sex, or individual circumstances. Two main types of typhus are recognised to-day: (1) the epidemic form, which spreads among louse-infested persons in close contact with each other, and which is carried from sick to healthy by lice; (2) the endemic form, a disease of rats, which is carried from rat to rat by fleas. Mooser, Varela, and Pilz (1934) have shown that the epidemic type can be converted into the endemic type, and conclude from this and other evidence that the rat is the reservoir of both the endemic virus and the epidemic virus.

In epidemic typhus it is the habits of the people—namely, the condition of overcrowding of houses and the presence of louse infestation of the inhabitants—which deserve immediate investigation and remedy; in endemic typhus, the rat being the reservoir, attention should be directed to defects in the house and to the habits of the dwellers which encourage the presence of rats. (In concluding this section it is worth observing that in 1919 Glen Liston said of four of these diseases which claimed annually more than a million lives—malaria, plague, typhus, and relapsing fever—that it was not an impossible task to banish, or at least greatly to lessen, their prevalence in India.)

Kala-azar Houses

Kermack and McKendrick (1931) were struck by the fact that the number of cases in which several infections occur in the same house appeared to be too great to be explained without the assumption of intra-house infection. Napier and Das Gupta (1931) found that frequently, in a household, a single case cropped up year after year. Michael (1925) stated that one point borne out by his observation was that kala-azar exhibits a tendency to cling to a house once it has made its appearance in it, and that it appears to be essentially a house infection, and in a lesser degree a site infection. Napier (1924), in studying kala-azar prevalence in Calcutta, gave a kind of specification for a kala-azar house:—

(*a*) Vegetation in close proximity to the dwelling.
(*b*) Earth unprotected by cement or paving stones in and around the dwelling.
(*c*) Ground floor residence, possibly with
(*d*) Insanitary conditions, especially with reference to the presence of fowls and ducks in and around the dwelling, within the endemic area with
(*e*) Masonry houses (rather than bamboo and *khola* huts).

Awati (1922) during a survey of 121 houses in Assam found 5·5 *Cimex rotundatus* and 4·25 *Pediculus* per house. Patton (1921) remarked that the localisation of the disease in George Town, Madras, to certain streets, and even to certain groups of houses, seemed to exclude the probability of a flying insect as being the invertebrate host of the parasite. Mackie (1915) in Assam examined several houses known to be highly infected with kala-azar by pulling them down piecemeal, and searching the thatch, walls, and floor. No ticks were found in the floors nor bed-bugs in the walls, which were of clay plastered with cow-dung; once or twice sandflies were found in underground rat burrows; but the author says that the people were obstructive, and little information was gained. Young (1914), at Golaghat in Assam, found that the disease had a well-defined tendency to cling to certain groups of houses and to spread from them into surrounding areas. In 40 infected families removed to new sites three years previously, an occurrence of the disease in a person not obviously infected on the old site was met with in only one case. On evacuation of a house in the old site in which infection had occurred it was burnt down, and with it all bedding, clothing, and other belongings which could presumably harbour insect parasites.

Dodds Price and Rogers (1914) said: "The facts collected having established that the infection clung to the houses or their sites, this sufficed to enable us to evolve a simple plan of dealing effectually with the epidemic which was ravaging the Nowgong district and ruining its chief industry." Coolies in new lines, only 400 yards from the old ones, had remained free from kala-azar for 16 years, whereas of 50 coolies of the same batch who had lived in the old infected lines for want of room in the new ones, no fewer than 16 per cent. were already dead of kala-azar, while others were suffering from the disease. Rogers (1905) records how some native peoples realised the infectiousness of kala-azar, and mentions an effective sanitary measure adopted by the Garos; they isolated cases of kala-azar in their huts, rendered them comatose with drink, and then burnt the hut and patient together. Dodds Price (1902), commenting on his nine years' supervision of kala-azar in Assam, said that segregation of the sick was of the utmost importance, and where coolie lines were badly infected they must be burnt and abandoned at all cost; and that the results he obtained by adopting these measures were gratifying in the extreme.

Although much evidence of association with the house has accumulated since Dodds Price's time, it is not yet possible to assign accurately the reasons for this connexion, owing to the fact that the method of transmission is still in doubt. We are therefore unable to convict either the method of construction or the material, or the site, or even the habits of the inmates as being the predominant factors against which preventive measures should be directed. The discovery of the value of segregation of the healthy might equally well incriminate faulty structure or material, some peculiarity in the site, or in the habits of the inmates—including in this last item overcrowding and close contact with infected cases.

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SUNLAMPS

Messrs. Hanovia Ltd., of Slough, makers of sunlamps, have acquired new and extensive showrooms at 3, Victoria-street, London, S.W. 1, a formal opening of which took place on Feb. 13th. Hanovia have rendered a real service to the medical profession by spending money in manufacturing sunlamps at a time when there was little or no demand for them; they have been justified in their enterprise, as there has been rapid development in the use of the lamps during recent years. At the new showrooms a complete range of medical models is permanently on exhibition, and visits by members of the medical profession are welcomed at any time.

WINTERING IN SWITZERLAND

THE QUEEN ALEXANDRA DAVOS FUND

THE winter is half over and full use has not yet been made of the funds available from this charity to enable educated people of small means who are threatened with tuberculosis, or who may be suffering from it in its earlier stages, to obtain the benefits of mountain air in Switzerland. The Fund is not intended for those who are suffering from chronic or advancing disease, or who require surgical treatment. The cases considered suitable are those convalescing from a pleurisy or pleural effusion, or with a lesion that is small both by clinical and radiographic criteria. To selected cases grants are made at the rate of 50 Swiss francs a week during the late autumn, winter, or early spring, on condition that the recipient stays at an approved institution in Davos. Grants will also be made to parents or guardians of children of the professional and middle classes, who may be suffering in the way already indicated, or who have other chest diseases such as bronchiectasis, fibrosis, unresolved pneumonia, asthma, or chronic bronchial catarrh, to enable them to stay in an approved home for children. In general, patients require about 100 francs a week to enable them to live in comfort at Davos, which means that they require a private income of £3 a week in addition to the grant provided by the Fund. Forms of application may be obtained from the hon. secretary, Mr. A. Stanley Herbert, 25, Birchin-lane, London, E.C.3. Applications will be considered by the selection committee and, if necessary, an appointment will be made for the applicant to see one of the honorary examining physicians in London. If after this interview an applicant is, for any reason, not considered suitable, a third-class railway fare will be paid to those residing over 50 miles from London.

MILK FOR MOTHERS AND YOUNG CHILDREN

THE success of the milk-in-schools scheme has led to a hope that cheap milk will also be provided for children below school age and to nursing and expectant mothers. In a memorandum addressed to the Milk Marketing Board, the Children's Minimum Organising Committee point out that this would benefit both the public health and the milk industry.

The B.M.A. committee on nutrition recommended one pint of milk a day as the "basal primary requirement" in diets of children between the ages of one and five, but the amount of milk bought by working-class families is nothing like sufficient to allow for a consumption even approximating to this figure. Many children in the poorer families never taste fresh milk, and an inquiry in Cardiff showed that among the households taking milk in the "new housing" and "poor working-class" areas the consumption per head was much lower in families with children than in those without. Where money is short and there are many mouths to feed the mother's first care is to satisfy her children's hunger; bread and potatoes are cheap and filling; milk is regarded as an extra. Mrs. C. M. Burns, in an investigation in 1931 into the milk consumption of 1000 families receiving milk assistance at welfare centres in County Durham, found that the average amount of fresh milk purchased per week fell from 0·7 pints per head for families of three persons to 0·4 pints for families of five persons, with still lower amounts for larger families. Sir John Orr in the course of an investigation (1929–30) involving 1000 unselected children from elementary schools in Scotland found that in the homes from which these children were drawn the average milk consumption per person was 0·35 pints per day. In the committee's view "it is safe to say that the majority of pregnant and nursing mothers and the younger children in working-class households to-day are not consuming anything like the quantities of milk agreed by the experts to be an *essential condition* of good health and optimal growth."

In order to enable the Milk Marketing Board to

maintain the present pool prices, and at the same time to sell manufacturing milk at world prices, the public are not only charged a relatively high price as consumers, but as taxpayers are subsidising the sale of cheap milk for manufacture. The committee suggest that it would disarm much possible criticism if it could be shown that such a policy does not result in depriving a large section of the community of a foodstuff essential for their children's health. In initiating the milk-in-schools scheme the Board have recognised how greatly the future prosperity of the industry depends on making the rising generation "milk-minded." It is obvious that this argument applies even more strongly in the case of children under five than of school-children; the earlier children get used to regarding a glass of milk as a normal part of their diet the more likely are they to develop a liking for it. The success of the schools scheme and the various investigations into milk consumption seem to indicate that in working-class households the demand is very elastic, and suggest that there would be a considerable demand for milk for younger children and for mothers if it were made available for them at the same price as for school-children. It is to be hoped, too, that local authorities would take advantage of the lower prices greatly to increase their supplies of free milk in necessitous cases. The number of children under five and of expectant and nursing mothers in England and Wales in the strata of society from which the elementary school-children are drawn is estimated at about 3½ million. If half this number took only one-third of a pint a day their total consumption would amount to 26 million gallons a year. This would of course be no advantage to the Board if this were to mean a parallel falling off in household consumption, but the committee think that this danger is often exaggerated. In working-class families milk is hardly ever bought for the children to drink, and it is scarcely conceivable that such families would forgo the small amounts they now buy to use in tea and cocoa and puddings simply because the mother or one of the children was having milk to drink from a centre.

The committee point out that producers are now guaranteed a minimum price of 5*d*. a gallon in summer and 6*d*. a gallon in winter for milk used in manufacture; it is understood that without the subsidy the price for such milk averaged about 5*d*. during the 12 months, October, 1933–34. They suggest that an extension of demand at a price anywhere above the minimum now guaranteed could not but be advantageous to the Board, especially in view of the increasing volume of milk coming on the market. They realise that the sale of milk at, say, 6*d*. or 7*d*. a gallon does not yield an adequate return to the producer, but suggest that if the only alternative use for such milk is sale, for manufacture, at the minimum price, then the Board would not be suffering any loss in offering it slightly above this figure to a class of consumers who would otherwise not buy milk at all. They hope that it may be possible for the Board to offer milk at, say, 7*d*. a gallon, and for the distributors to make a similar concession, so that the price charged at the centres may be brought down to 1*s*. a gallon. If, however, this is not practicable they strongly urge the Board to enter into negotiations with the Government with a view to securing a grant for the purpose.

As regards administration, it is proposed that milk at 1½*d*. a pint should be made available for sale or free distribution for children below school age and for expectant and nursing mothers at any distributing centre which the local authority or an approved voluntary organisation may use or set up for the purpose. As much elasticity as possible should be allowed in the arrangements for distribution. There are about 3000 maternity and child welfare centres, most of which would be appropriate for the purpose, but these with the few day nurseries, nursery schools, and toddlers' clinics would scarcely be adequate for the extensive service the committee have in mind. In some areas it should be possible to make special arrangements at small cost to the local authority by which the milk could be distributed at the schools (though not by the teachers). In others, it might be possible to use a shop, the local authority paying the shopkeeper a lump sum to act as a distributing centre, on the analogy of the payments now made to sub-post offices. "Such a scheme," the memorandum concludes, "if worked with the active coöperation of the Ministry of Health and with energy and imagination by the local authorities would, we believe, do much to inculcate the milk habit, be of some value to the industry in increasing the demand for milk, and would be widely welcomed as a measure of enormous benefit to the health of the nation."

The committee's address is 116, Thames House, Millbank, London, S.W. 1.

A CASTLE IN ANDALUSIA

DURING the Spanish revolution, following the tradition of revolutions against the existing order, the Republicans in the first enthusiasm of a successful coup d'état not only burned churches but threatened church-supported institutions, including hospitals. The tension in one of these hospitals, where 50 patients lay critically ill at the moment when doctors and nurses—nuns disguised in borrowed clothes—were ordered to evacuate, forms one of the dramatic episodes of a novel published this week.[1] The medical officer in charge, himself a republican, is one of those humanitarians on whose vision depends the reconstruction of a disorganised state. His restraining influence at the time of crisis, and his efforts later to mitigate the distress associated with the break-up of feudal loyalties provide an effective contrast to the irresponsible behaviour of extremists on both sides. The revolution is described from the point of view of an English girl who marries a Spanish nobleman; the disillusionment which follows her discovery of his shallow character is intensified by the attractions of his body-servant, actually a half-brother, whose devotion to the family and loyalty to its traditions provide the main theme of the book. The story remains exciting to the last chapter, and the pictures of peasant life in Andalusia should send many tourists off the beaten track.

BAD NAUHEIM AND ANTI-SEMITISM

THE Directorate of the Hessian State Bath at Nauheim write under date Feb. 21st, 1935, a letter of which the following is a literal translation:—

"We are aware of the fact that THE LANCET as a leading medical organ enjoys not only in England the greatest reputation. We think therefore we may assume with certainty that you will give honour to the truth by publishing in the next issue of your journal the following correction. We rely on your sense of right and your good name as one of the oldest medical journals of the world. There have reached us questions based on rumours which may be traced back to a notice which appeared sometime ago in your journal.

"Permit us, as Directorate of the Hessian State Bath of Nauheim, to give you the categoric assurance that in the acceptance and treatment of invalids at Nauheim no kind of distinction is made. We emphasise that Jewish invalids are treated exactly as all other invalids. They enjoy the same advantages of medical and spa treatment and make exactly the same use as all other invalids of the social arrangements, entertainments, concerts, and theatre pieces. In the hotels and boarding houses they also receive exactly the same treatment. We had last season a number of Jewish visitors from various countries, among them some Jewish invalids from Palestine.

"You fulfil a debt of honour by publishing this letter, and allow us to give expression to our gratitude."

[1] Castle in Andalusia. By Elizabeth Sprigge. London: William Heinemann Ltd. 1935. Pp. 343. 7*s*. 6*d*.